



USER MANUAL

DynaPCN 10-20-00

Ethernet Passenger & People Counter

Rev 3.0 – 27 October 2015 – DYPCN-10-20-00_UserMan_En_3.0

Trademarks

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Revision history

REVISION	DESCRIPTION	DATE
1.0	First release	30 April 2013
2.0	Updated "Main features" section	25 August 2015
3.0	<ul style="list-style-type: none">• Updated features• Updated Digital Input features	27 October 2015

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Important user information

Carefully read and understand the instructions in this manual before using the device.

Whenever you have any doubts regarding the operation of this device, first consult this manual, and then if you are still unable to resolve your issue, contact the Eurotech Technical Support Team for assistance.

To lower the risk of personal injury, electric shock, fire or damage to equipment, you must observe the following precautions, as well as using good technical judgment, whenever installing or using this device.

Alerts that can be found throughout this manual

Symbol	Meaning
	<p>DANGER! Information highlighting potential electrical shock hazards:</p> <ul style="list-style-type: none">• Personal injury or death could occur.• Damage to the system, connected peripheral devices, or software could occur. <p>Appropriate safety precautions should always be used; these should meet the requirements set out for the environment that the equipment will be deployed in.</p>
	<p>WARNING! Information highlighting potential hazards:</p> <ul style="list-style-type: none">• Personal injury or death could occur.• Damage to the system, connected peripheral devices, or software could occur. <p>Appropriate safety precautions should always be used; these should meet the requirements set out for the environment that the equipment will be deployed in.</p>
	<p>NOTE These will highlight important features or instructions.</p>

Safety notices and warnings

Users must observe the following safety precautions during all phases of operation, service, and repair of the device. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the device.

Eurotech assumes no liability for the customer's failure to comply with these requirements.

The safety precautions listed below represent warnings of certain dangers of which Eurotech is aware. You, as the user of the device, should follow these warnings and all other safety precautions necessary for the safe operation of the device in your operating environment.

Do not operate in an explosive atmosphere



WARNING!

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Antistatic precautions



WARNING!

To avoid ESD (Electro Static Discharge) damage, always use appropriate antistatic precautions when handling any electronic equipment.

Connection to power supply or other devices



DANGER!

Before applying power to the system, thoroughly review all installation, operation, and safety instructions.

Failure to install the system power supply correctly or to follow all operating instructions correctly may create an electrical shock hazard, which can result in personal injury or loss of life, and/or damage to equipment or other property

- To avoid injuries, always disconnect power and discharge circuits before touching them.
- Only start the device with a power supply that meets the requirements stated on the voltage label. In case of uncertainties about the required power supply, please contact the Eurotech Technical Support Team or the electricity authority
- Before connecting other equipment carefully read any supplied instructions
- Always disconnect the power before connecting or disconnecting cables
- Do not perform connections with wet hands
- Check any power cords for damage before use
- Use certified power cables. The power cable must meet the requirements (voltage and current) of the device.
- Position cables with care. Avoid positioning cables in places where they may be trampled on or compressed by objects placed on them. Take particular care of the plug, power-point and outlet of power cable
- Avoid overcharging any power outlets
- Only apply power to the device or connected equipment after checking that all the above conditions have been met

Installation

**WARNING!**

- Verify that the mounting location can withstand the added loads caused by the addition of the device, it should be firmly secured so that it will not cause any potentially hazardous situations (e.g. falling down due to vibration or shock)
- Do not operate the device near heat sources or flames.

**NOTE:**

If the device must be moved from one place to another with different ambient temperatures, ensure sufficient time for the temperature of the device to stabilize before repowering.

Ventilation

**WARNING!**

Ensure adequate ventilation to avoid overheating, Eurotech suggests the following steps:

- When installing the device within a cabinet, rack or other enclosed space, be sure to leave sufficient space to allow adequate air circulation
- Do not block any ventilation openings

Maintenance

**DANGER!**

- Never open, dismantle or repair the device!
 - For your maintenance or repair requirement please contact a qualified Eurotech engineer.
- If the device does not function correctly and you are unable to find a solution, feel free to contact the Eurotech Technical Support Team.

If the equipment does not work properly, especially if smells unusual, unplug it immediately and contact Technical Support Eurotech (see fourth cover of this manual for details).

Cleaning

**WARNING!**

When cleaning the device, remember to:

- Ensure sufficient ESD protection during the cleaning process
- Remove any power from the device
- Use a dry cloth to remove dust and fingerprints from the external casing
- Do not use detergents, aerosol sprays, solvents or abrasive sponges

To clean the lenses:

1. Use a blower to remove any dust
2. Use water-based, non-flammable, glass/plastic cleaner products to remove all types of dirt; grease, oil, nicotine etc. from the lenses
3. Gently wipe the lenses with a lint-free cloth.

**WARNING!**

The DynaPCN 10-20-00 should not be used for extended periods of time with the service plate removed. Doing so can cause dust and other particulates to enter the system thus causing degradation to the optics.

If it is necessary to have extended access to the Mini-USB connector, take appropriate precautions to stop any particulates from entering.

Life support policy

**WARNING!**

Users must not use Eurotech products as critical components of life support devices or systems without the express written approval of Eurotech.

Warranty

Please contact your local Eurotech Sales Office for detailed warranty terms and conditions.
Refer to the back covers of this manual for full contact details.

CE Notice

This product is marked CE.

The CE Mark on the product indicates that the system has been tested and conforms to the provisions of the 2004/108/EC Electromagnetic Compatibility (EMC) Directive and the 2006/95/EC Low Voltage Directive (LVD).

Eurotech shall not be liable for use of our products with equipment (i.e., power supplies, personal computers, etc.) that are not CE marked and that do not meet the product's technical requirements indicated in this manual.



WEEE

In compliance with the Directive 2002/96/EC on waste electrical and electronic equipment (WEEE), the symbol on the left, shown on the product or within its literature, indicates separate collection for this EEE (electrical and electronic equipment), that has been placed on the market after 2005.

This product, at the end of its life cycle, must be collected separately and managed in accordance with the provisions of the current Directive on waste electrical and electronic equipment.

Because of the substances present in the product, improper use or disposal of the refuse can cause damage to human health and the environment.

To avoid any possible legal implications, contact the local waste collection body for full recycling information.



RoHS

The product described in this document, including all its components, and subassemblies that are an integral part of the product, have been manufactured in compliance with the Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Technical assistance

For any technical questions, or if you cannot isolate a problem with your device, or for any enquiry about repair and returns policies, feel free to contact your local Eurotech Technical Support Team.

See the back cover for full contact details.

Transportation

When transporting any module or system, for any reason, it should be packed using anti-static material and placed in a sturdy box with enough packing material to adequately cushion it.



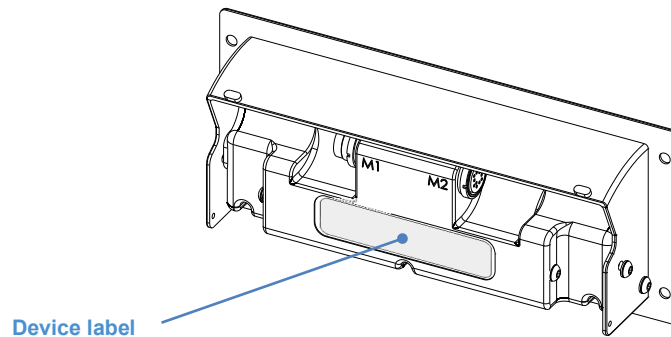
Warning:

Any product returned to Eurotech that is damaged due to inappropriate packaging will not be covered by the warranty!

Device labelling

On the rear side of the device you can find a label displaying the following information:

- Model Number
- Serial Number
- Power Requirements



Conventions and definitions used within this Manual

The following conventions and definitions are used throughout this manual:

The “Mode” of the register:

SYMBOL / TEXT	DEFINITION
RW	Readable and Writable register
RO	Read only register
W	Meaning of the register when written
R	Meaning of the register when read

Hexadecimal numbering:

Hexadecimal numbers are indicated like this: 0x01.

Control Unit, Host PC

The terms “Control Unit” and “Host PC” are used to describe a computer connected to the DynaPCN 10-20-00 for maintenance and configuration activities.

DynaPCN 10-20-00, Device, Counter, Master, Slave

In this manual the terms:

- “DynaPCN 10-20-00”
- “Device”
- “Counter”
- “Master”
- “Slave”

are used to describe the DynaPCN 10-20-00 people/passenger counter.

PART 1 – INTRODUCTION

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DynaPCN 10-20-00 general description

The DynaPCN 10-20-00 is a compact and autonomous device that uses a stereoscopic vision technology to count passengers entering and exiting the doorways of transportation vehicles, such as buses and trains. It can also be used to count people entering and exiting gates in cinemas, amusement parks, shopping centres, etc.

The DynaPCN 10-20-00 has been developed to be connected to an Ethernet network.

The stereoscopic cameras installed on the front panel (also called sensors) capture images of the area below the device (called the Detection area); the infrared LED emitters allow for reliable operations in any type of lighting condition.

The DynaPCN 10-20-00 analyse the Detection area, and when a person enters or leaves, the incoming or outgoing values are stored accordingly, along with time and date information.

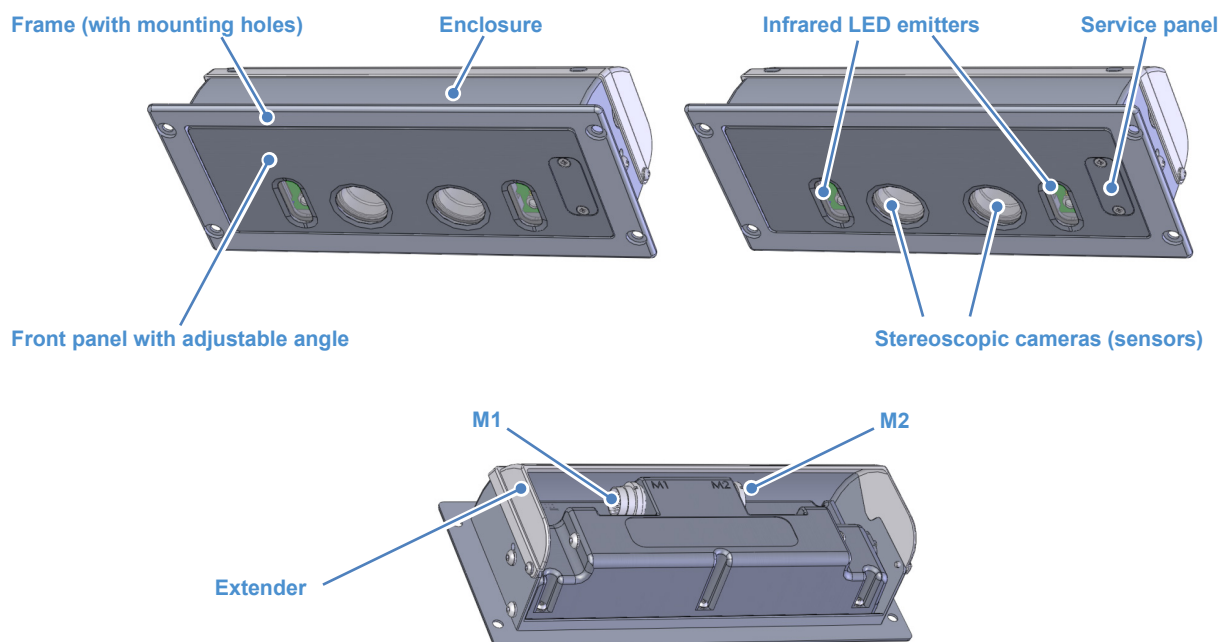
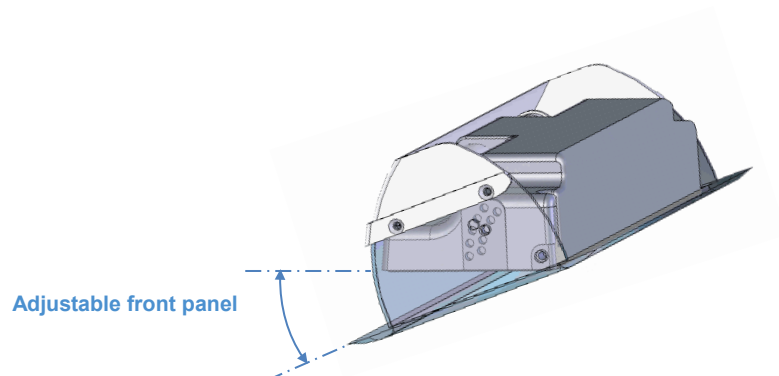
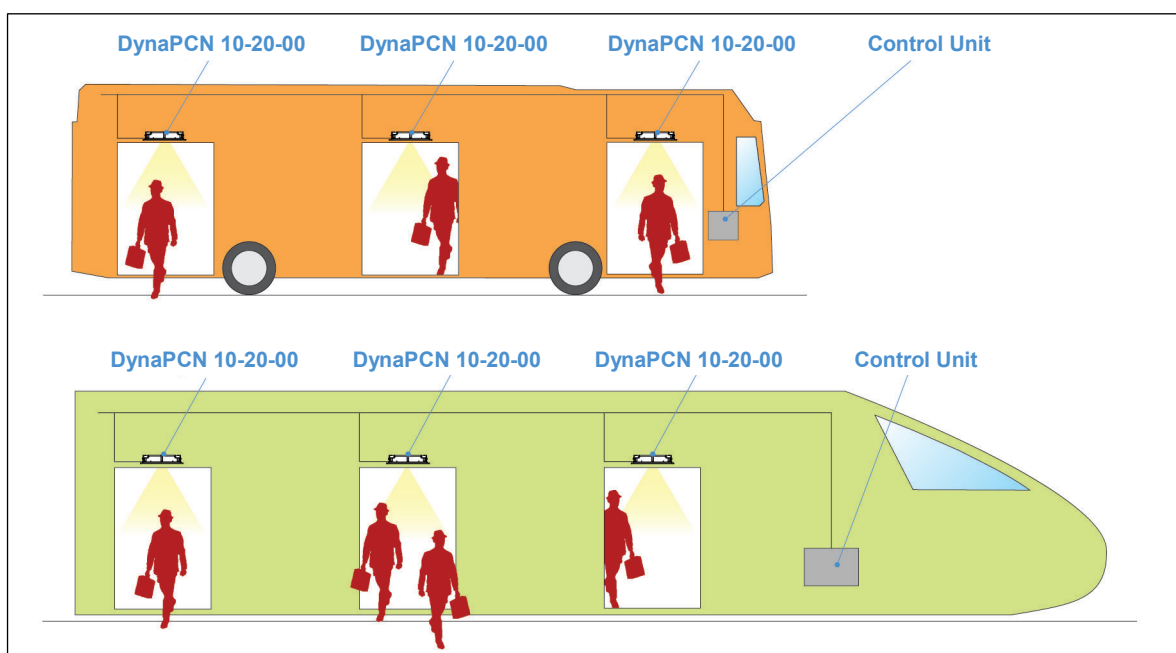


Figure 1. DynaPCN 10-20-00 front and rear

The front panel can be tilted up to 45°: the DynaPCN 10-20-00 can be placed in an ideal position even if the mounting surface is not horizontal.



The DynaPCN 10-20-00 can work stand-alone or networked together with a vehicle server - the Control Unit - that can pre-process, store, and upload information from all the passenger counters.



Main features

FEATURE	DESCRIPTION
APPLICATION	Automatic passenger counting (accuracy: 98%; precision: 99%)
TECHNOLOGY	Stereoscopic image capturing
INTERFACES	<ul style="list-style-type: none"> • 10/100 Ethernet • Insulated Digital I/O • USB 1.1 (service)
CONNECTORS	<ul style="list-style-type: none"> • M1: 4-pin female M12 D-Code • M2: 12-pin female circular
MECHANICAL & IP RATE	IP65 sealed magnesium alloy enclosure
POWER SUPPLY	9 – 36 VDC
MAXIMUM POWER CONSUMPTION	<ul style="list-style-type: none"> • 3.2 W with infrared illuminators turned OFF • 7.8 W with infrared illuminators turned 100% ON
STANDARDS	<ul style="list-style-type: none"> • Automotive E24: ECE ONU Reg.10 • Fire protection: EN 45545 • EMC emissions: EN 50155 / EN 50121 / EN 50011 • EMC immunity: EN 50155 / EN 50121 / EN61000 • Environmental: EN 50155 • Vibrations & shocks: EN 50155 / EN 61373
OPERATING TEMPERATURE	EN 50155 Tx
WEIGHT	0.6 kg
DIMENSIONS (mm)	FRAME <ul style="list-style-type: none"> • Height 100 x Width 230 x Thickness 3 REQUIRED CUT-OUT <ul style="list-style-type: none"> • Height 82 x Width 209 x Depth 42 (frame at 0°) to 70 (frame at 45°)
MTBF	> 500000 hours
ACCESSORIES	Starter Kit, Configuration software

Front interfaces. The service panel

The DynaPCN 10-20-00 on the front side has a Service panel that protect the interfaces for configuration, maintenance, and development of applications.

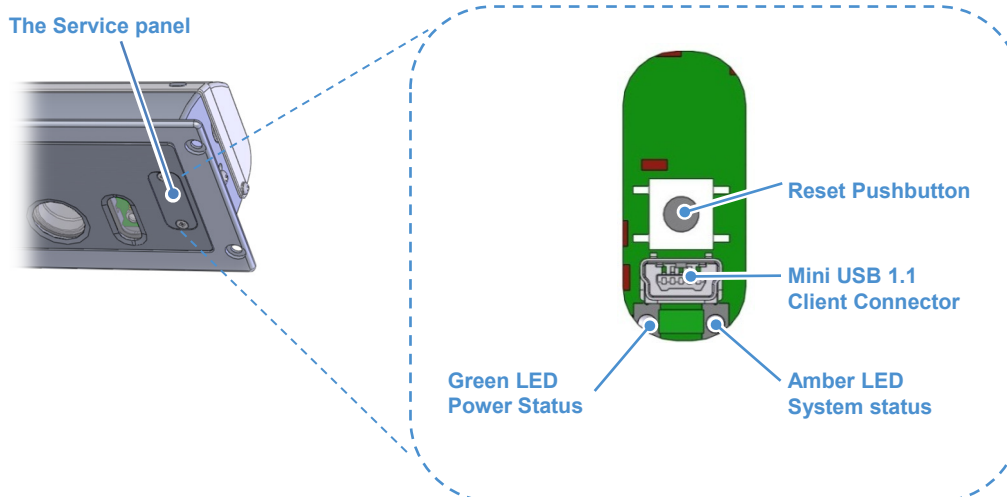
The Service panel is held in place by 2 Torx M3 * 6 screws. Use a Torx T9 screwdriver to remove the screws.



NOTE:

Do not use the DynaPCN 10-20-00 for extended periods of time with the Service panel removed, otherwise the IP grade will be lost, and dust and other particulates may enter the system, causing degradation to the optics.

If it is necessary to have extended access to the Mini-USB connector, take appropriate precautions to stop any particulates from entering.



LED indicator assignment

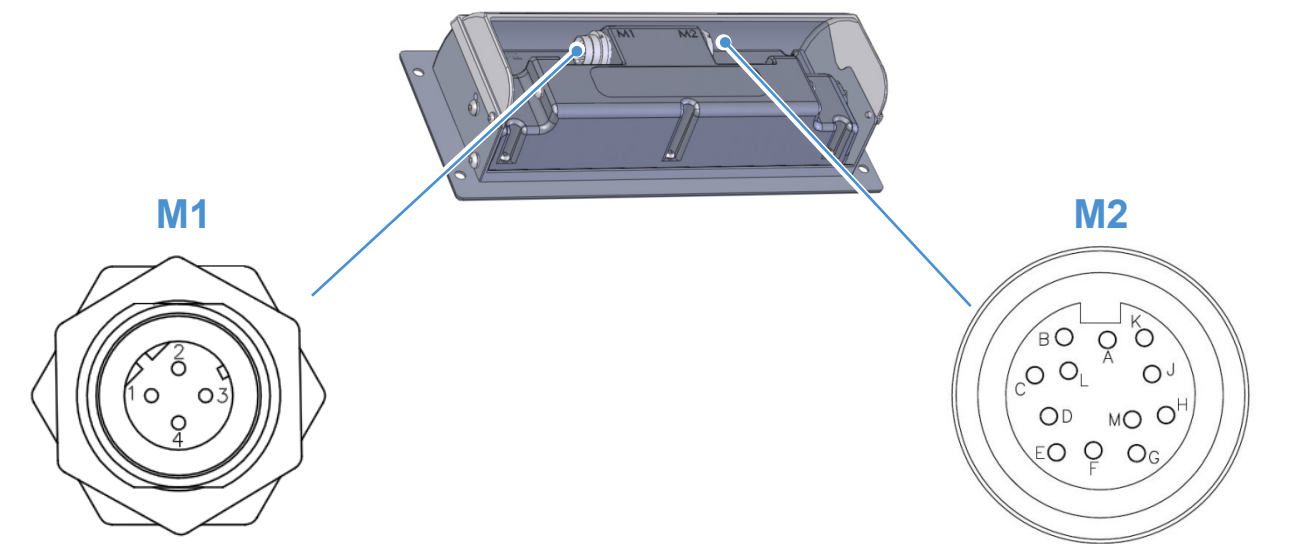
LED COLOUR	MEANING	LED STATUS
Green	Power status	ON: DynaPCN 10-20-00 turned ON OFF: DynaPCN 10-20-00 turned OFF
Amber	System status	Blinking: Boot in progress ON: Boot finished and DynaPCN 10-20-00 ready to operate

Notes about the Mini USB port

This is a standard Mini-USB type “B” 1.1 client port and is used to connect the DynaPCN 10-20-00 to a Host PC for maintenance and configuration.

Rear interfaces

The DynaPCN 10-20-00 has the following interface connectors on the rear panel:



CONNECTOR CHARACTERISTICS:
Type: 4-pin female M12 circular connector
P/N: Lumberg 0986EFC152

COUNTERPART CHARACTERISTICS:
Type: 4-pin male M12 circular connector
P/N: Conec 43-00161

PIN	SIGNAL
1	ETH_TX+
2	ETH_RX+
3	ETH_TX-
4	ETH_RX-

CONNECTOR CHARACTERISTICS:
Type: 12-pin female circular connector
P/N: Lumberg 030512

COUNTERPART CHARACTERISTICS:
Type: 12-pin male circular connector
P/N: Lumberg 033212

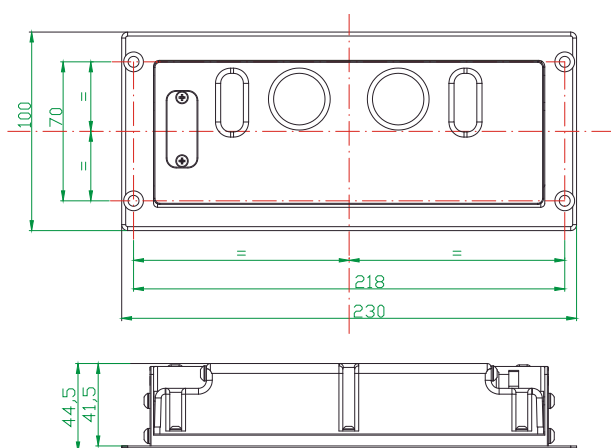
PIN	SIGNAL
A	Power IN +
B	Power IN -
C	Digital OUT 2 V+
D	Digital OUT 2
E	Digital IN 2 +
F	Digital IN 2 -
G	Digital OUT 2 GND
H	RS485_WG GND
J	RS485_WG +
K	RS485_WG -
L	Digital IN 1 +
M	Digital IN 1 -

Mechanical Characteristics

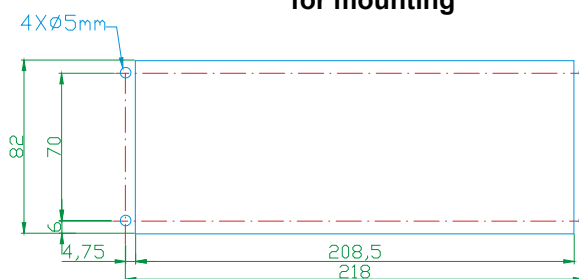
DYNAPCN 10-20-00 FRAME	
Height:	100 mm
Width:	230 mm
Thickness:	3 mm

REQUIRED CUT OUT DIMENSIONS	
Height:	82 mm
Width:	209 mm
Depth:	41.5 to 70.0 mm, depending on optical panel angle

DynaPCN 10-20-00 dimensions



Required cut-out dimensions for mounting



Dimensions are in millimetres



WARNING!
PROVIDE SUFFICIENT ANCHORAGE WHEN MOUNTING THE DYNAPCN 10-20-00.
THIS MUST BE DONE TO ENSURE THAT THE DYNAPCN 10-20-00 DOES NOT BECOME DETACHED DURING TRANSIT CAUSING A SAFETY HAZARD.

PART 2 – DYNAPCN 10-20-00 INSTALLATION PROCEDURE

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1 Install the DynaPCN 10-20-00

1.1 Preliminary considerations

First of all you have to ensure that the counter installation height is suitable for your application, taking into consideration:

- the local population's average height
- the width of the gate to detect

The number of counters required depends on the width of the gate and the installation

The relation between number of devices, installation height and maximum gate width is showed in the following table:

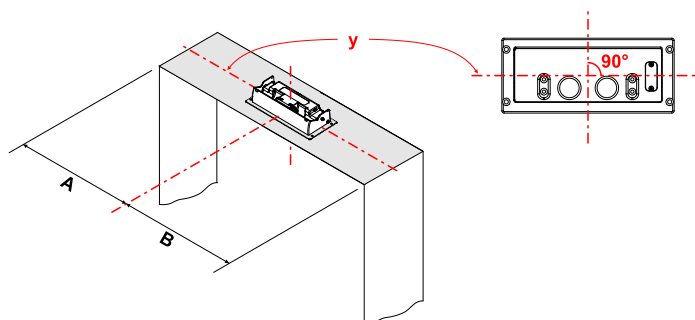
INSTALLATION HEIGHT [cm]	MAX GATE WIDTH [cm]		
	Using 1 counter	Using 2 counters (wide-gate)	Using 3 counters (wide-gate)
180	150	210	270
200	180	240	300
220	200	260	320
250	200	260	320

If the gate is wider than 200 cm you have to connect together two or more devices. This configuration is called "Wide-gate" and requires a master device and one or more slave devices:

- Use a DynaPCN 10-20-00 as a Master device
- Use a DynaPCN 10-01-00 as a Slave device

Installing one counter

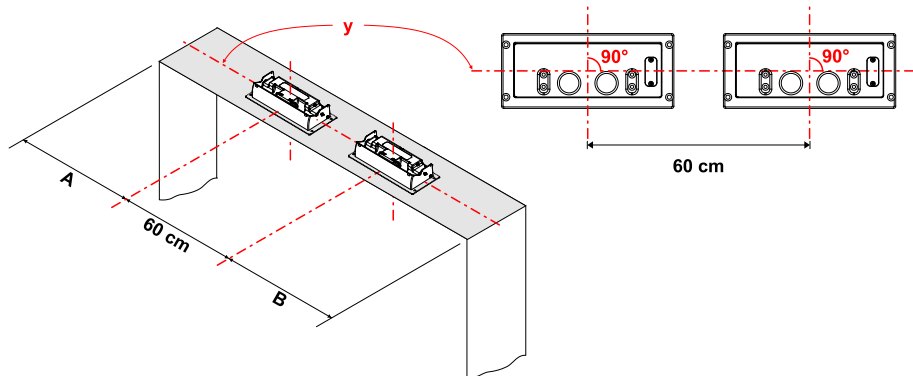
- The Counter should be aligned with respect to the gate
- Ideally the counter should be mounted in the centre of the gate ($A=B$). However if this is not possible, the counter can also be mounted up to 30 cm either side of the centre point.



Installing two (or more) counters in Wide-gate configuration

- The counters must be aligned with each other and with respect to the gate
- The distance between the centres of each counter must be 60 cm
- Ideally the group of counters should be mounted in the centre of the gate ($A=B$). If this not possible, the group can also be mounted up to 30 cm either side of the centre point. However, the distance between each counter has always to be 60 cm

For further information about how to connect Mater and Slave devices refer to the document: "DynaPCN Connection Diagrams".

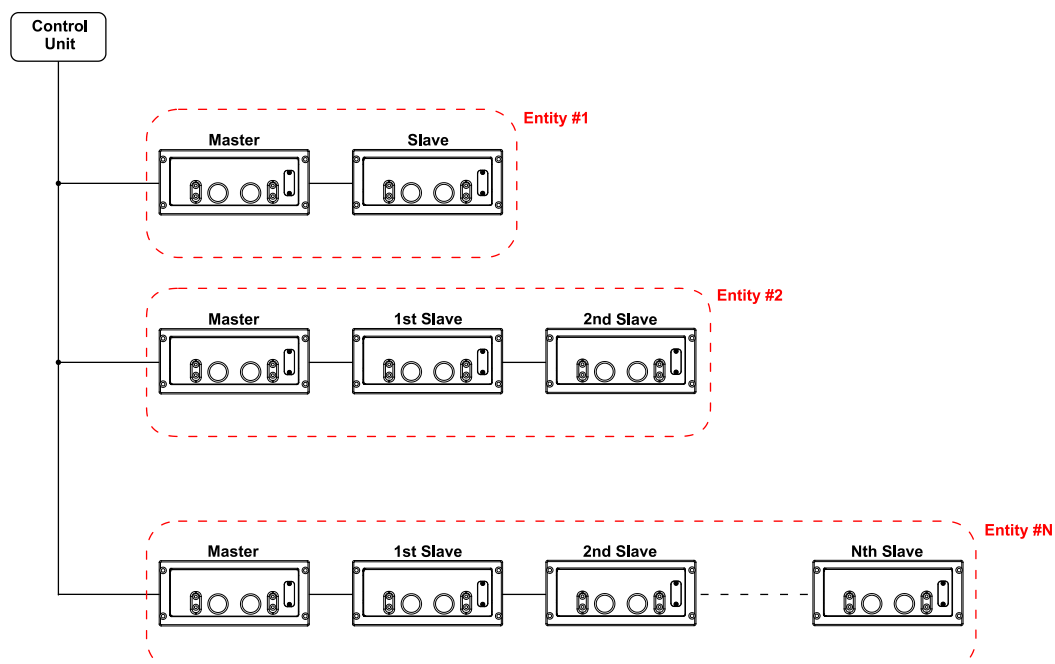


Note about devices connected in Wide-gate configuration

The figure below shows different devices in Wide-gate configuration, all managed by the same Control Unit (for example the Host PC).

The Control Unit sees each Wide-gate configuration as a single entity: Entity #1, Entity #2, ..., Entity #N.

While the Master devices can be set with user-defined parameters the Slave devices have to remain with the factory default parameters, as these are configured by the Master device upon power-up.



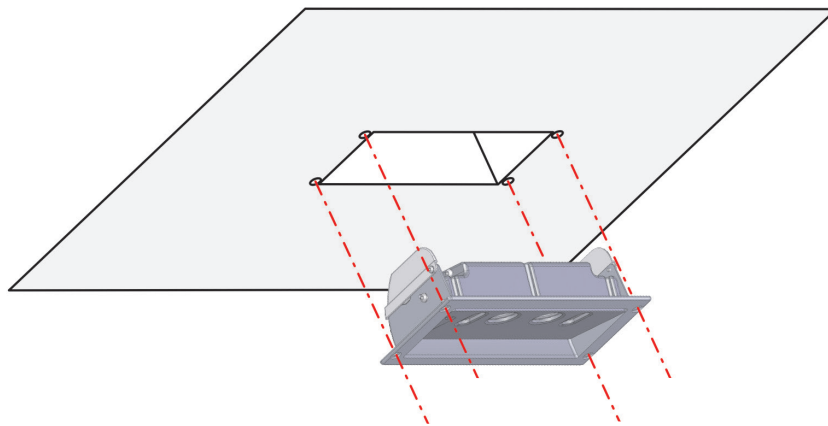
1.2 Find the installation area and set it up

To install the DynaPCN 10-20-00 you usually need to set up the installation area:

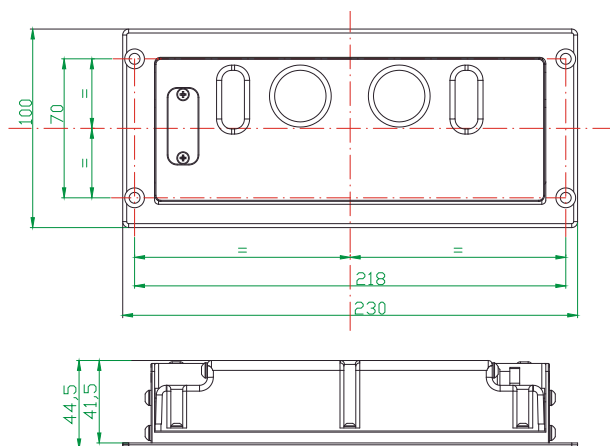
1. Make an opening in the ceiling above the door to detect. You can use the “[Cut-out template](#)” on page 77 to simplify this operation
2. Provide a secure anchorage point for the DynaPCN 10-20-00.

The frame of the DynaPCN 10-20-00 has four mounting holes which allow you to fix the DynaPCN 10-20-00 using four M5 screws.

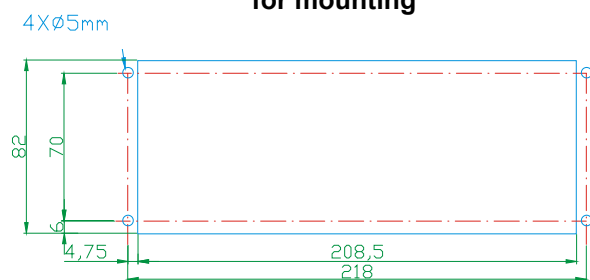
You will have to provide all necessary fixing hardware. This will depend on the location, material, and any applicable regulation. Use anti-vandalism screws to increase security.



DynaPCN 10-20-00 dimensions



Required cut-out dimensions for mounting



Dimensions are in millimetres

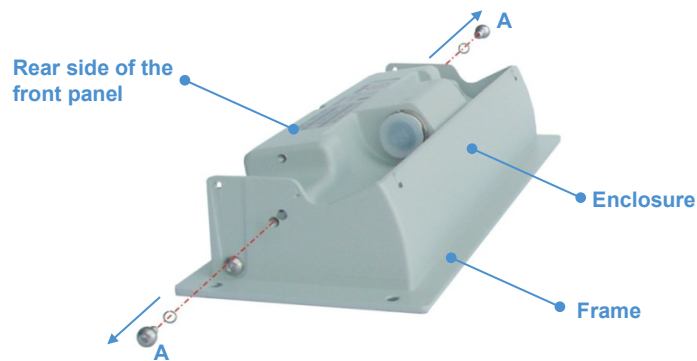
1.3 Connect the rear side interfaces and adjust the angle of the front panel

Two connectors, M1 and M2, are available on the rear side of the DynaPCN 10-20-00; these are used to connect the DynaPCN 10-20-00 to the vehicle data bus or to use a Wide-Gate configuration.

Two M4 x 6 stainless steel hexagonal head screws and two split washers (A) keep fixed the angle between the front panel and the frame.

1. Loosen the front panel to simplify the cabling procedure:

1. Keep the DynaPCN 10-20-00 with the rear side facing up
2. Using a hexagonal 2.5 mm (7/64") key/driver remove the lateral locking screws and washers at each end (A)



2. Prepare the connection cable for the network

1. Prepare a cable to connect M1 to a network.
As option is possible to use the E14-30-10-00 (POE/Ethernet cable) ¹



¹ For further information about how to connect the DynaPCN refer to the document: "DynaPCN Connection Diagrams"

3. Prepare the power supply cable and the power source

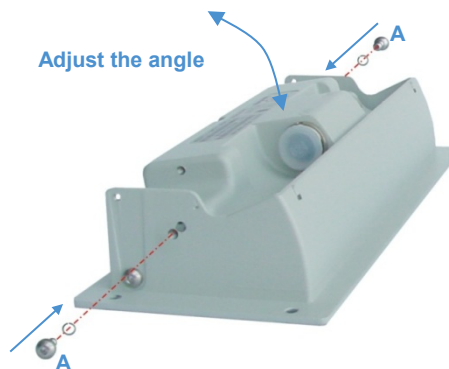
1. Prepare a cable to supply the power to the device via the M2 connector.
As option is possible to use the E14-35-10-00 cable (Multifunction cable 2) ²



2. Set up a DC power source to meet the DynaPCN 10-20-00 power requirements:
3. Make sure this DC power source is turned OFF

4. Adjust the angle of the front panel and secure the front panel

1. The front panel should be as horizontal as possible when the DynaPCN 10-20-00 is in its final installed location.
Adjust the angle between the front panel and the frame of the DynaPCN 10-20-00.
To mount the front panel with angles higher than 35° refer to [“Installing the front panel with angles higher than 35°”](#) on page 73.
2. Secure the front panel by reinserting and tightening the two locking screws and washers at each end (A)

**IMPORTANT NOTE!**

Once the DynaPCN 10-20-00 is installed, the angle of the front panel cannot be modified and the rear connectors cannot be accessed without removing the entire DynaPCN 10-20-00 from the ceiling.

² For further information about how to connect the DynaPCN refer to the document: “DynaPCN Connection Diagrams”

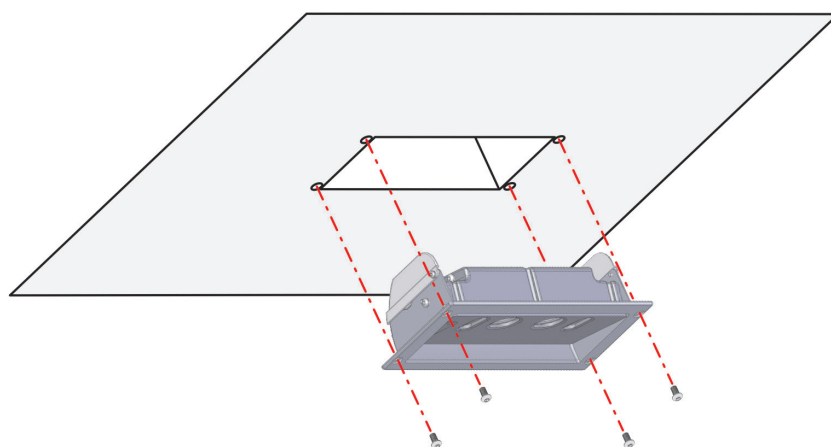
1.4 Fix the DynaPCN 10-20-00 to the ceiling

Fix the DynaPCN 10-20-00 in place paying attention to not damage the connections realized in the previous steps.

**WARNING!**

When mounting the DynaPCN 10-20-00 ensure sufficient anchorage in order to firmly fix it to the ceiling. This will avoid any hazardous potentially situations (i.e. dropping down) during normal service.

If the DynaPCN 10-20-00 is used within transportation vehicles and it is not firmly fixed, its steadiness may be affected by vibrations or other influences typical of transportation vehicles. This may cause counting errors.



2 Configure the network between DynaPCN 10-20-00 and Host PC

The “Host PC” is a computer connected to the DynaPCN 10-20-00 for maintenance and configuration activities.

There are two ways to setup a network between the DynaPCN 10-20-00 and the Host PC:

1. Using a network with an available DHCP server
2. Connecting the DynaPCN 10-20-00 to the Host PC using an USB connection

2.1 Setup the Network between the DynaPCN 10-20-00 and the Host PC using a network with an available DHCP server

1. **Make sure a network with a DHCP server is available**
2. **Make sure the DC power source is turned OFF**
3. Connect the cable coming from M1 to the Ethernet network
4. Connect the cable coming from M2 to the DC power source
5. Turn the DC power source ON
6. The DynaPCN 10-20-00 turns ON: the green LED is ON
7. The DynaPCN 10-20-00 starts to boot: the amber LED blinks
8. When the DynaPCN 10-20-00 is ready to operate both the green and amber LED indicators are ON (not blinking)
9. The DynaPCN 10-20-00 acquires the IP address from the DHCP server.
10. Make sure the Host PC is turned on and ready to operate
11. **Make sure that the Host PC and the DynaPCN 10-20-00 are connected to the same subnetwork**

2.2 Setup the Network between the DynaPCN 10-20-00 and the Host PC using an USB connection

1. Make sure both the DynaPCN 10-20-00 and the Host PC are turned on and ready to operate before connecting them together
2. On the Host PC, Download and unzip the PCN-1001 demo tools
 - a) Download the “PCN-1001 demo tools” from www.eurotech.com/download
You will receive a file named “pcn-1001-demo-xxxxxxx.zip”
 - b) Unzip the received file
 - c) Unzip the “Eurotech.zip” file contained within the “pcn-1001-demo- xxxxxxxx” folder

Note: xxxxxxxx will be the latest revision number

3. Connect the DynaPCN 10-20-00 with the Host PC
 - a) Locate:
 - the standard Mini-USB type “B” connector behind the service plate of the DynaPCN 10-20-00
 - a free standard USB type “A” connector on the Host PC
 - b) Use a Male Mini USB type “B” to Male USB type “A” cable to connect the Mini USB port of the DynaPCN 10-20-00 to the USB port of the Host PC (you can also use the USB - MiniUSB cable contained in the development kit)

4. Which Operating System is installed on your Host PC?

- Windows XP:

- Once the USB connection has been established the Host PC will detect the new hardware and display the following message: "Found New Hardware"
- Shortly after, the Window "Found New Hardware Wizard" will start
- Select "No, not at this time" and click "Next"
- Select "Install from a list or specific location (Advanced)" and click "Next"
- Click "Browse" to the PCN-1001 drivers that have been created when you have extracted the zip
- The hardware wizard will find the file "linux.inf"; click "Open"
- Select "OK" in the screen that will appear
- Click "Next" in the screen that will appear
- The hardware wizard will now install the driver. Select "Finish" in the screen that will appear
- The installation procedure will start. Follow the instructions that will appear on the Host PC.
- Windows will automatically find and install the drivers that are located in the path:
\\drivers\\win2000

- Windows 7 or later:

- Install the "RNDIS Ethernet Gadget"

Once the USB connection is established the Host PC detects the new hardware, but it cannot find the new driver for the "RNDIS Gadget".

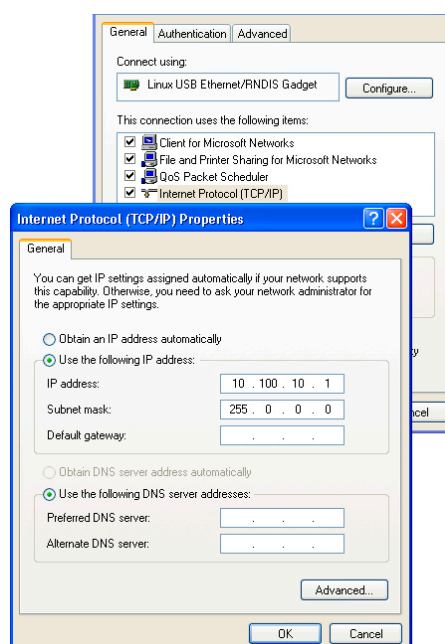
You have to install the RNDIS Gadget manually using the following procedure:

- Have access to "Device Manager"
- Search for "RNDIS Ethernet Gadget". It should have an "!" stating the failed installation
- Update the "RNDIS Ethernet Gadget" using the file "linux.inf" located in the "Eurotech" folder (the path will have a name like: "pcn-1001-demo-2.3.11.4\\Eurotech\\Eurotech\\PCN-1001\\2.3.11.4")

- The installation procedure starts.
A new LAN is created.

5. Verify the TCP/IP Properties

- Double-click "Internet Protocol (TCP/IP)" The "Internet Protocol (TCP/IP) Properties" dialog box will appear



b) Select “Use the following IP address” radio button

c) In the “IP address” field enter the following:

10	.	100	.	10	.	1
----	---	-----	---	----	---	---

d) In the “Subnet mask” field enter the following:

255	.	0	.	0	.	0
-----	---	---	---	---	---	---

e) Click on the “OK” button of each Dialog Box” until all are closed.



NOTE:

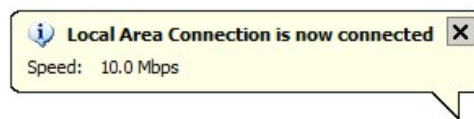
By default the IP address of the DynaPCN 10-20-00 is [10.100.10.100]

The Host PC network IP address can be altered to meet the end users requirements; the first field must be 10, the last three fields should be numbers ranging from 0 to 254.

The Host PC address must be different from the PCN-1001 address. In this case, you cannot insert [10.100.10.100] as the connection between the two systems would not function.

If in any doubt, contact your system administrator for further instructions.

f) A message similar to the following appears according to the OS installed on the Host PC when the DynaPCN 10-20-00 has successfully connected:



6. Configure the Host PC firewall



WARNING!

If the Host PC has a firewall running, the following ports **MUST** be open. If not, even if the DynaPCN 10-20-00 is properly connected no image will appear within the WinClient.

PORT	PROTOCOL	DIRECTION
5400	TCP	◄►
5402	UDP	◄
5403	UDP	◄

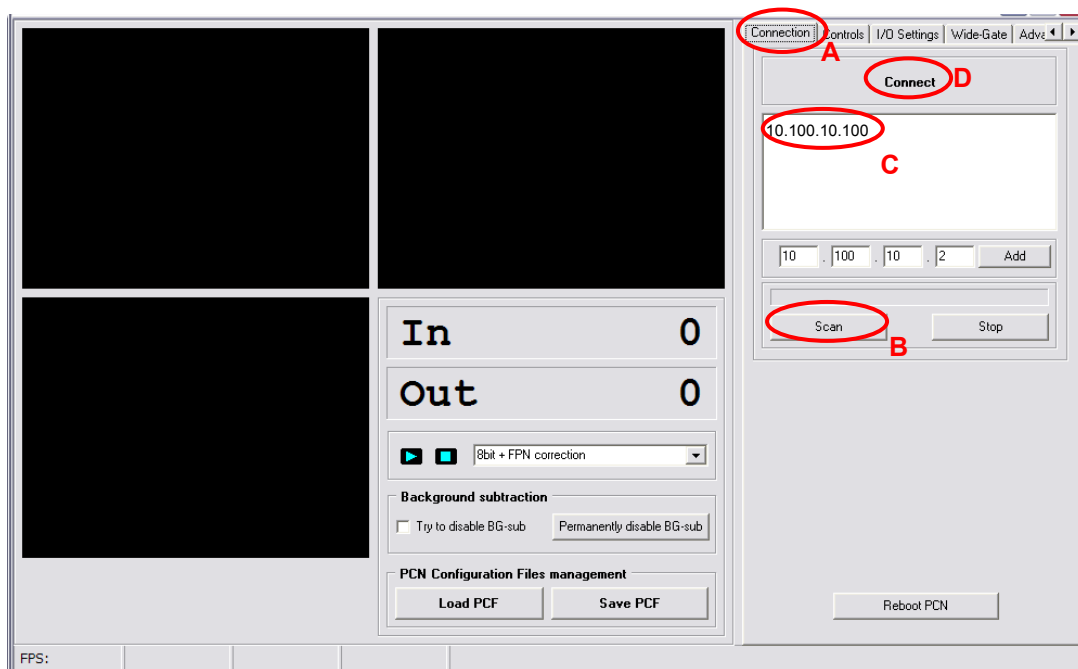
3 Use WinClient to network DynaPCN 10-20-00 & Host PC

“**WinClient**” is a Graphical User Interface (GUI) that allows you to configure/debug the DynaPCN 10-20-00. The *WinClient* software has been created to access and configure a single DynaPCN 10-20-00 at a time. Before proceeding, make sure you have already installed WinClient on your Host PC. If not please refer to “[Download the software](#)” on page 43 for further details.

After the DynaPCN 10-20-00 has been connected to the network, *WinClient* has to detect it.

Follow these steps to detect the DynaPCN 10-20-00 and network it together with the Host PC:

1. Select the "Connection" tab (A). Click the “Scan” button (B)
2. The address of the DynaPCN 10-20-00 will appear (C). Select it
3. Click the “Connect” button (D)
4. Now the DynaPCN 10-20-00 is networked to the Host PC



NOTE:

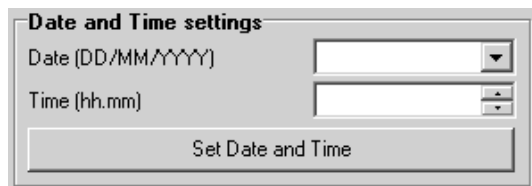
The DynaPCN 10-20-00 acquires its IP address using a DHCP server. If WinClient does not identify the IP address of the DynaPCN 10-20-00 automatically, this may mean that DynaPCN 10-20-00 and Host PC are not in the same subnetwork.

3.1 Set the main parameters in the “Controls” tab

The “Controls” tab allows you to change the main settings of the DynaPCN 10-20-00 in order to obtain a good resolution on windows 1, 2 & 3.

Any modifications to the settings will be automatically saved to the internal flash memory of the DynaPCN 10-20-00 and takes immediately effect (a reset is not needed).

1. Set the “Date and Time settings”



Displays and allows you to set the system time and date.

Set date and time correctly!

This is extremely important especially in stand-alone installations where the user periodically downloads data via the USB using the “Save Records” feature.

2. Set the “Light intensity”



Leave the checkbox unchecked.

For installations within buildings:

In these kinds of installation, it is assumed that the environment has a constant illumination.

It may be best to try several settings to find the one that best works for your individual requirements.

For on-board installations:

Slide the bar completely to the right to put the light intensity to maximum.

This will increase the counting accuracy even in installations where the environmental lighting conditions are always changing and can suddenly vary.

3. Set the “In/Out direction”



Be careful to set the direction for incoming and outgoing people correctly. The best method is to have a person enter the door, and verify that the correct counter In or Out is updated.

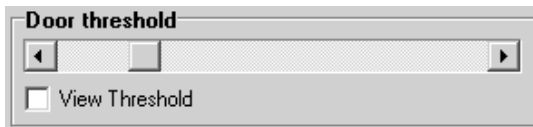
Changing the direction will reset the in/out counters.

4. Set the “Door width”



Slide the bar to set the door width.

5. Set the “Door threshold”

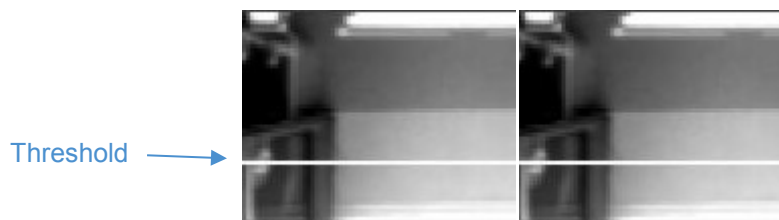


Together with “Scene background”, “Door threshold” is one of the two most important parameters that have to be properly set to obtain a reliable counting process.

During the tracking process, the two counters are incremented only if a person enters the detection area, crosses the door threshold and then exits from the detection area on the opposite side.

By default, the threshold is placed at row 60 (the image height is 120 rows). The position of the line can be set between row 30 and row 89.

In each visualization mode, except for “Tracking”, flagging the “View Threshold” checkbox will display the current threshold (a white horizontal line) in Windows 1 and 2.



Guidelines to find the best threshold position:

- Place it in a way that any person entering or exiting has to cross it.
- Place it away from high reflective surfaces (i.e. the steps on a bus/train). If the detection area includes also a portion outside the transportation vehicle, the door threshold should not be set outside.
- Place it away from door-opening mechanisms
- It should be placed in the middle of the detection area, which if the DynaPCN 10-20-00 has been installed correctly above the door, should correspond to a central position of the “Door threshold” slide bar

If a door is intended to be used in a single direction, for example “in only” or “out only”, it may be useful to move the threshold towards the exit edge of the detection area.

6. Use the “Scene background” button to acquire and store the background

Scene background

Together with “Door threshold”, “Scene background” is one of the two most important parameters that have to be properly set to obtain a reliable counting process.

The acquisition and storage of the background is a fundamental and sensitive issue.

A bad background acquisition can seriously affect the counting process.



IMPORTANT NOTE:

Acquire the background in the following circumstances:

- Once the DynaPCN 10-20-00 has been installed
- When the DynaPCN 10-20-00 has been relocated
- If the background has altered

Pay attention to the following issues:

- The background has to be taken with no foreign removable objects in the detection area
- The background has to be taken with doors open, especially if the doors would block the DynaPCN 10-20-00s' field of view as frequently occurs within buses or trains
- Lighting of the detection area should be diffused as much as possible. No spot lighting (e.g. solar reflections or strong lighting) should be present in the detection area during background acquisition
- Highly reflective, geometric structures situated on or near the floor, such as the metallic parts of a door mechanism, which cause extreme patterns of light and darkness when illuminated by strong light (e.g. direct sunlight or directional halogen lighting) could lead to flawed distance measurements. To avoid performance degradation due to these effects the structures and any highly reflective surfaces should be avoided as much as possible in the detection area
- Metallic or shiny objects (such as handles, bars, glass, etc.) should not cover a significant part of the detection area. If this is not avoidable, the reflectivity of these items should be reduced by means of non-reflective materials or modifying the “No Tracking Zone”
- If necessary, use the features of the “No Tracking Zone” panel in “The “Advanced” tab” (page 65).
The “No Tracking Zone” feature allows you to define rectangular zones in the detection area where tracking will not be performed. This feature can be used to mask surfaces that are very reflective or with spot lighting

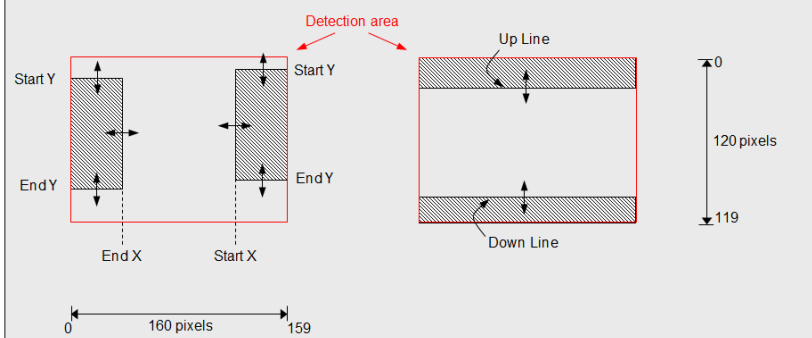
RANGES:

End X = pixel 0 to 70
Start X = pixel 159 to 91
Start Y = pixel 0 to 119
End Y = pixel 119 to 0

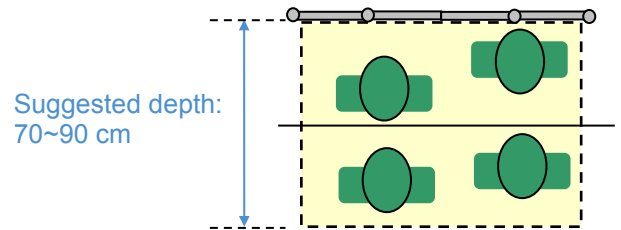
Up Line = pixel 0 to 59
Down Line = pixel 119 to 60

Example:

The picture below shows the detection area with no tracking zones (represented as dashed areas):



- Exclude as much as possible the area outside the transportation vehicle
- Verify that all the entrance area is detected properly. Make a person move under the DynaPCN 10-20-00s and verify the correct detection
- The DynaPCN 10-20-00 can't track more than 10 people at a time. In particularly crowded conditions, i.e. on-board buses, 10 people can be compressed in less than 1 m^2 , so the detection area should be smaller. In these conditions a depth of 70~90 cm is fine to guarantee a good tracking of people.



To save the background, complete these steps:

1. Connect the DynaPCN 10-20-00 by pressing the “Connect” button
2. Select “8bit Disp. + median + FPN + ODC” in the drop-down list. In this way Windows 1 and 2 will display the separated images as seen by the two cameras, subtracting the Fixed Pattern Noise (FPN) and the Optical Distortion Correction (ODC). Window 3 will display the disparity map and a median filter will be applied for reducing noise
3. Press the “►” button
4. **Ensure the doors of the gate are open**
5. **Check that the DynaPCN 10-20-00 is correctly set up.**
In windows 1 and 2 you must see the scene as captured by the two cameras while in window 3 the image has to be completely black or dark grey-scaled.
If for any reason it does not appear dark or any white spot appears, this will be recognised as one or more objects present in the detection area. A background stored in these conditions may reduce counting accuracy during the tracking process. Refer to the “Important issues:” paragraph for possible solutions
6. Press the “■” button
7. Select the “Controls” tab and click the “Scene Background” button. Ensure that window 3 remains completely dark or dark grey-scaled until the process has completed. If not restart from step “5”

Wait for the progress bar to complete. When completed, the “Scene background Saved!” dialog box will be displayed.



NOTE:

Pay careful attention that the USB cable or any part of your body, especially feet, are not visible in the detection area

4 Use WinClient to test the tracking of people

The “tracking” process consists of a 3D image displayed in window 3 that is the differences between the images from the left and right cameras.

The image in window 3 is also called “Disparity map”. As objects become closer to the cameras they will appear lighter in colour.

To verify the tracking process:

1. Select “Tracking” in the drop-down list
2. Click the “►” button
3. Check if the images in window 3 are correctly displayed when somebody enters into the detection area.

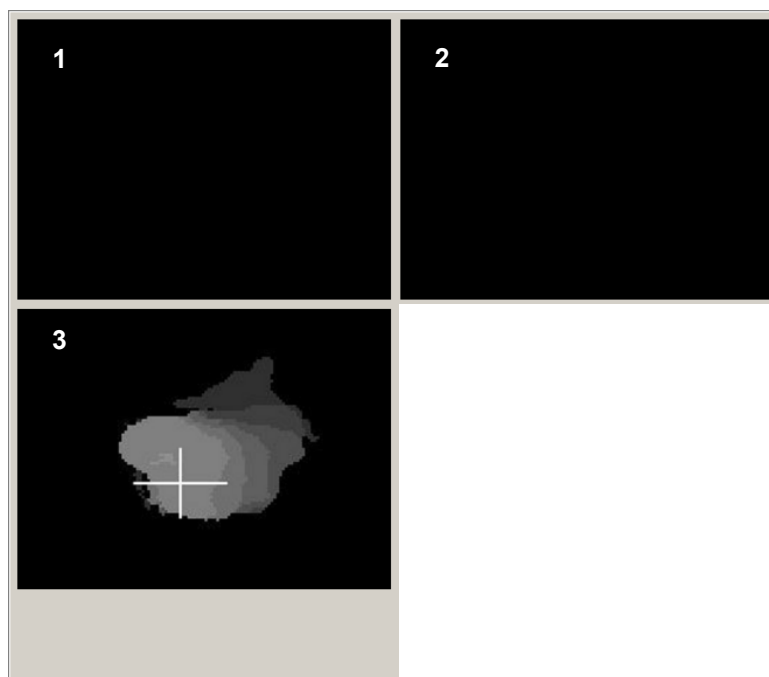


Figure 2. The tracking process

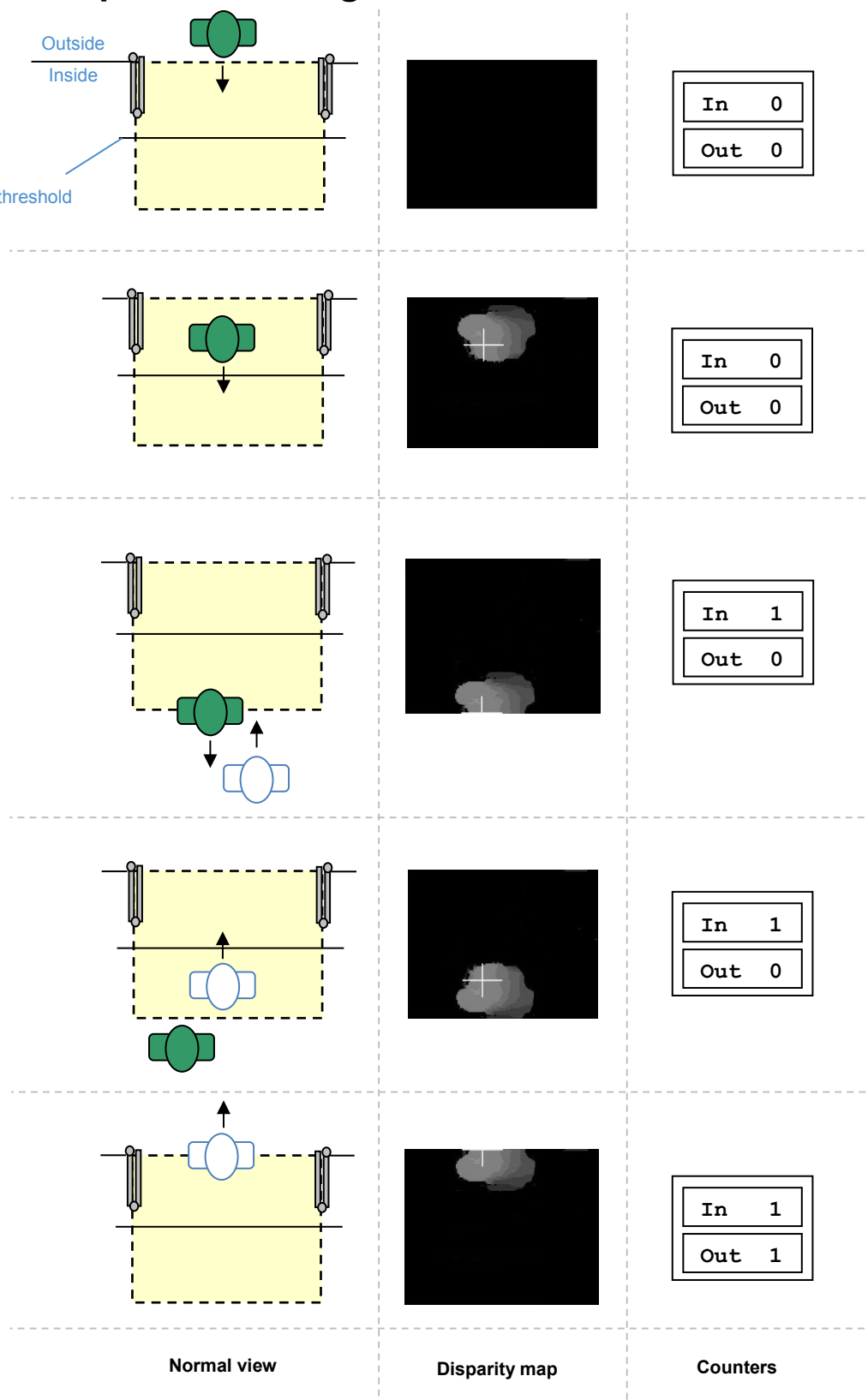
To close the *WinClient* software and stop the counting process:

1. Click the Disconnect button in the Connection Tab to disconnect the DynaPCN
2. Close WinClient

To close the *WinClient* software and continue counting:

1. Close WinClient. The DynaPCN will continue counting according to the user's configuration.

4.1 Example of counting



Remember:

During the tracking process, the two counters are incremented only if a person enters the detection area, crosses the door threshold and then exits from the detection area on the opposite side.

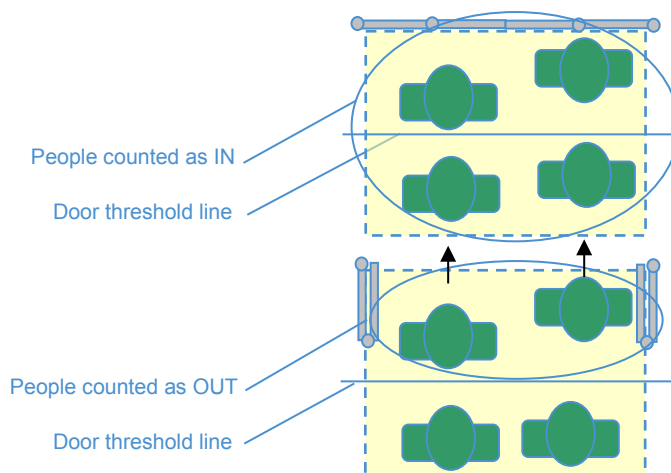
4.2 How the threshold works when using digital inputs

**NOTE:**

Refer to '[Notes about the Digital I/O interface](#)' on page 59 for further information about the digital inputs.

When the counting process is disabled (i.e. when the door is closed), people remaining anywhere in the detection area will be counted as IN, and the counter will be amended accordingly.

When the counting process is enabled (when the door is open), every person already within the door threshold line and the portion of detection area facing the door, will be counted as OUT if they leave the detection area; again, the counter will be amended accordingly.

**WARNING!**

The commutation time of digital inputs is extremely important because any propagation delay in the signal may affect severely the precision of the counting.

The digital inputs should enable the DynaPCN 10-20-00 as soon as the door starts opening and should disable it after the door is closed completely.

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PART 3 – THE DYNAPCN 10-20-00 SOFTWARE


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Download the software


You can download the software to use with the DynaPCN 10-20-00 from www.eurotech.com/download.

The main software packages to be used are:

- pcn-1001-demo

Manual Tools Utility Application Notes		
File	Size	Description
pcn-1001-demo-2.3.11.3.zip	 (1415 Kb)	Demo tools to manage the PCN-1001 (Rev. 2.3.11.3)

- pcn-1001-Imgserver

Manual Tools Utility Application Notes		
File	Size	Description
pcn-1001-Imgserver-2.3.11.3.zip	 (66 Kb) (Rev. 2.3.11.3)	Imgserver program to manage the PCN-1001



WARNING!

THE SAME VERSION OF “PCN-1001-DEMO” AND “*IMGSERVER*” MUST BE USED RESPECTIVELY ON THE HOST PC AND ON THE DYNAPCN 10-20-00. INCOMPATIBILITIES WILL OCCUR AND THESE WILL CAUSE PROBLEMS IF OLDER AND NEWER VERSIONS OF EITHER THE “PCN-1001-DEMO” OR “*IMGSERVER*” ARE USED TOGETHER. THE INFORMATION CONTAINED IN THIS DOCUMENT REFER TO RELEASE 2.3.11.5 AND LATER

The pcn-1001-demo package

Save and unzip the pcn-1001-demo package on your Host PC into a specific folder (e.g. create a “Eurotech PCN-1001” folder).

You will obtain the “*WinClient*” and the “*RS485_GUI*” programs

The *WinClient* program

“*WinClient*” is a stand-alone program that allows you to configure/debug the DynaPCN 10-20-00.

WinClient has been created to access and configure one DynaPCN 10-20-00 at a time.

The *RS485_GUI* program

Not used with your DynaPCN 10-20-00.

The pcn-1001-Imgserver

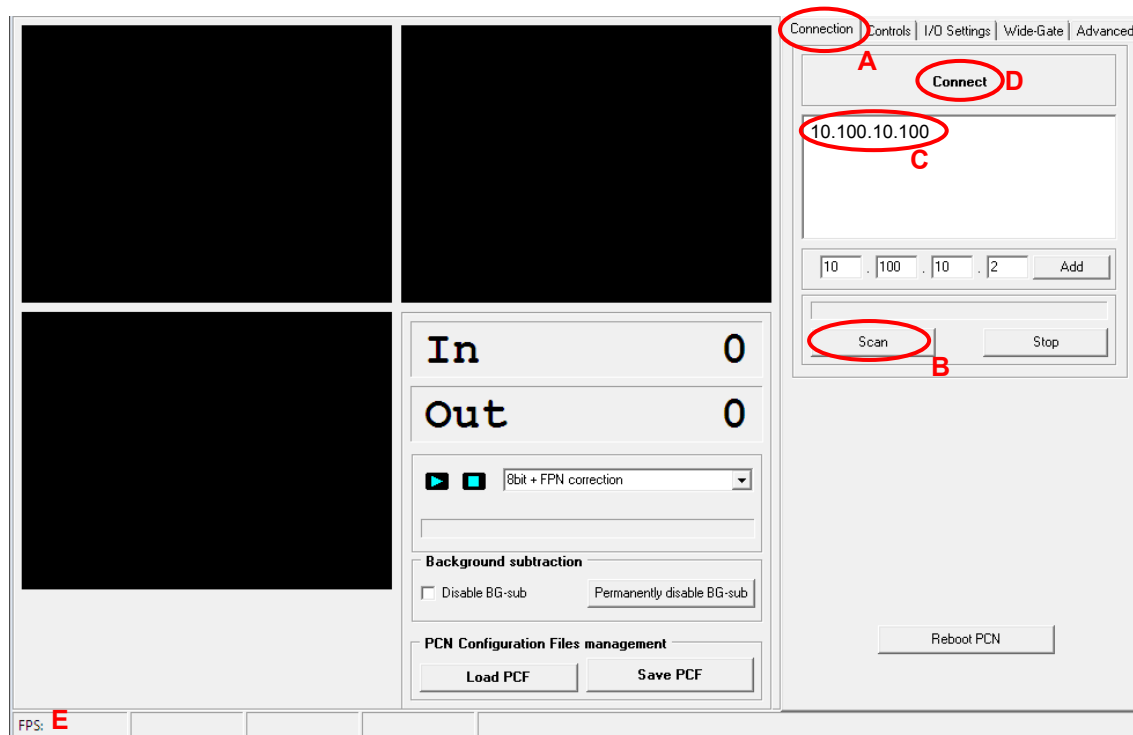
“*Imgserver*” is a daemon program that runs on the DynaPCN 10-20-00, it starts at boot time and performs the people counting tasks.

The DynaPCN 10-20-00 comes with *Imgserver* ready installed and ready to work.

When available, new versions of the *Imgserver* can be installed in the following way.

Update Imgserver

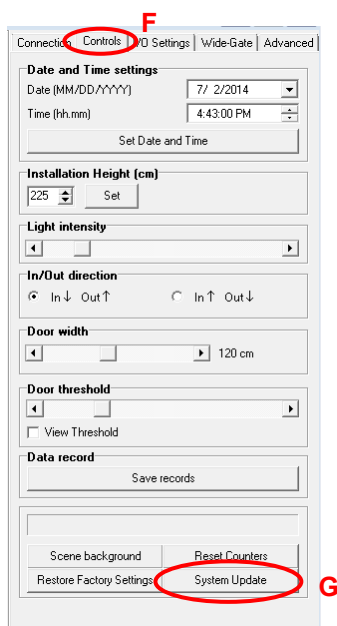
1. Turn ON the DynaPCN 10-20-00. Connect the DynaPCN 10-20-00 to the Host PC via USB. Refer to “[Install the DynaPCN 10-20-00](#)” on page 23 and “[Configure the network between DynaPCN 10-20-00 and Host PC](#)” on page 29 for further information
2. Run WinClient



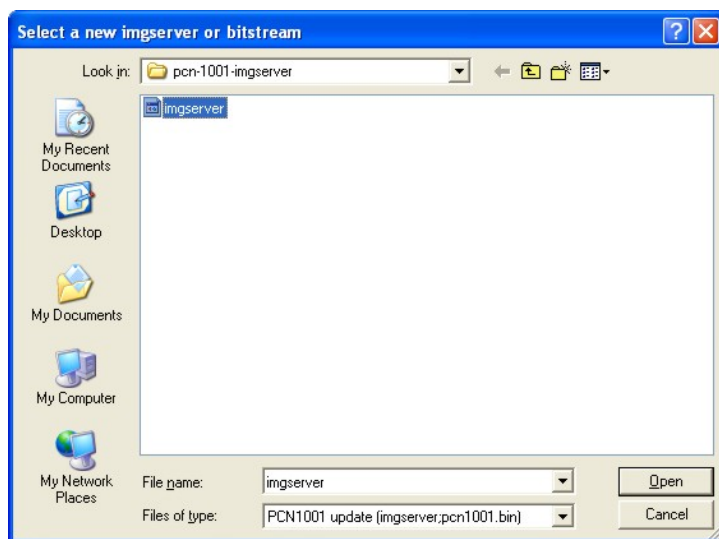
3. Select the "Connection" tab (A) and click the "Scan" button (B).
Select the address of the required DynaPCN 10-20-00 (C). Click the "Connect" button (D).

When connected, the *Imgserver* version will be displayed on the bottom line (the Status bar; E)

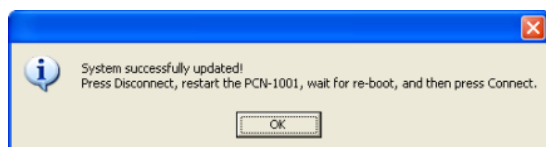
4. Select the "Controls" tab (F) and click the "System Update" button (G)



5. A dialog box appears.
Open the folder with the latest *Imgserver* file. Select the *Imgserver* file. Click "Open"

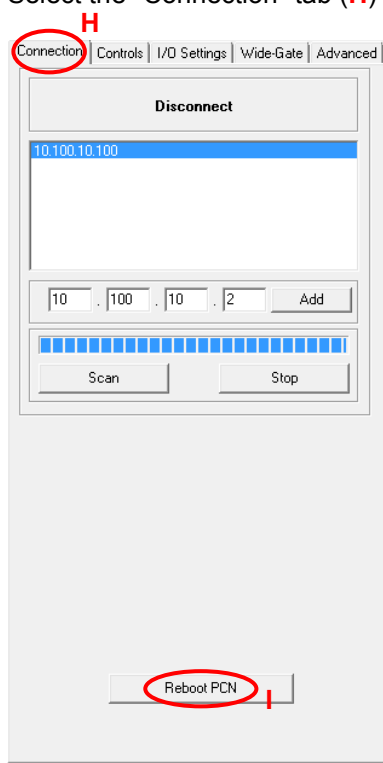


6. The *Imgserver* is updated.
When done the following confirmation message appears:



Click "OK"

7. Select the "Connection" tab **(H)** and click the "Reboot PCN" button **(I)**



8. Close the *WinClient* program
9. Reconnect (as done at steps 3 and 4)
10. Verify that the *Imgserver* has been updated by looking at the versions in the status bar

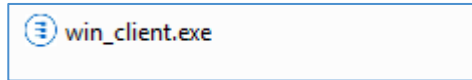
**Note:**

Refer to the download area of www.eurotech.com to download the most updated software version.

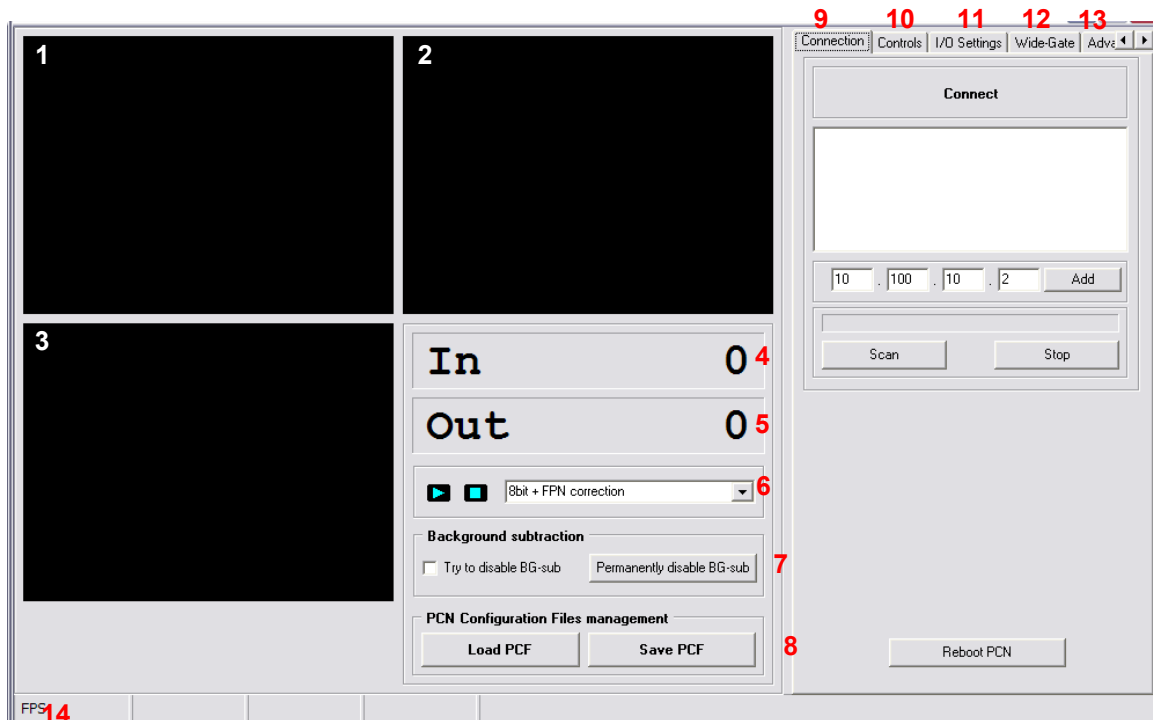
WinClient functions

Make sure you have properly connected and configured both the Host PC and the DynaPCN 10-20-00.

Double-click the *win_client.exe* icon to run the program



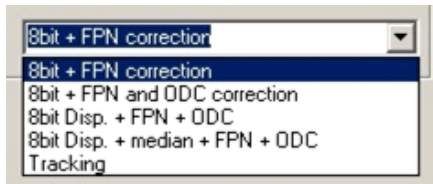
The *WinClient* graphical interface appears:



- 1 & 2 Window displaying the left and right images acquired from the individual cameras
- 3 Window displaying the tracking process and the disparity map
- 4 Incoming counter
- 5 Outgoing counter
- 6 Drop-down list
- 7 Background subtraction
- 8 PCN Configuration Files Management
- 9 "Connection" tab
- 10 "Controls" tab
- 11 "I/O Settings" tab
- 12 "Wide-Gate" tab
- 13 "Advanced" tabs 1/2 and 2/2
- 14 Status bar

The drop-down list

The drop-down list offers a choice of visualization modalities for the windows 1, 2 and 3:



- **8bit + FPN correction**

Windows 1 and 2 will display the separated images as seen by the two cameras, subtracting the Fixed Pattern Noise (FPN)
- **8bit + FPN and ODC correction**

Windows 1 and 2 will display the separated images as seen by the two cameras, subtracting the Fixed Pattern Noise (FPN) and the Optical Distortion Correction (ODC)
- **8bit Disp. + FPN + ODC**

Windows 1 and 2 will display the separated images as seen by the two cameras, subtracting the Fixed Pattern Noise (FPN) and the Optical Distortion Correction (ODC).
Window 3 will display the disparity map
- **8bit Disp. + median + FPN + ODC**

Windows 1 and 2 will display the separated images as seen by the two cameras, subtracting the Fixed Pattern Noise (FPN) and the Optical Distortion Correction (ODC).
Window 3 will display the disparity map and a median filter will be applied for reducing noise
- **Tracking**

This is the only modality that activates the counting. Window 3 will display the disparity map and a median filter will be applied for noise reduction. Furthermore some white crosses will appear to indicate the detected people and trace their movement

The Start and Stop buttons

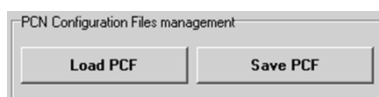
The Start (“▶”) and Stop (“■”) buttons allow you to respectively start and stop the counting process.

The background subtraction



Flag the checkbox to enable/disable the background subtraction and verify if the background affects the counting. Press the button you permanently disable the background subtraction. This is a non-reversible option: the background will be deleted. You will need to re-acquire the background if you need to subtract it again. Refer to [Acquire the “Scene background”](#) on page 55 for further details about the background.

PCN Configuration Files management (PCF)



It allows you to save the current configuration and load it to other DynaPCN 10-20-00 devices without setting each DynaPCN 10-20-00 individually.

This feature is useful when you have several DynaPCN 10-20-00 devices that have to be installed and all will have the same operating conditions (i.e. same door on different buses of the same type).

**Note:**

The DynaPCN 10-20-00 configuration that is going to be saved will contain all the setup parameters except for the "Scene Background".

How to save a PCF

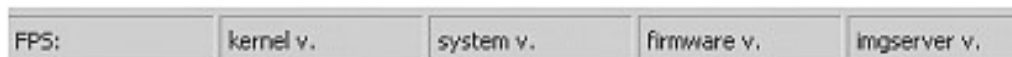
1. Make sure that the DynaPCN 10-20-00 is not running (click the "■" button)
2. Click the "Save PCF" button
3. Save the current configuration with a file name (i.e. Config1)

How to load a PCF

1. Make sure that the DynaPCN 10-20-00 is not running (click the "■" button)
2. Click the "Load PCF" button
3. Select the proper file name (i.e. Config1) and click "Open"

**NOTE:**

The "Scene Background" must be retaken for each new DynaPCN 10-20-00, even if the background is theoretically the same

The status bar

When the DynaPCN 10-20-00 is working, the status bar displays the following information:

Value	Description
FPS:	Frames Per Second. The number of images displayed by <i>WinClient</i> every each second.
Kernel v.	The Linux kernel version
System v.	The Operating system version.
Firmware v.	The FPGA firmware version.
Imgserver v.	The <i>Imgserver</i> program version.

Notes about images acquisition and FPS

During normal operations (default mode), the DynaPCN 10-20-00 acquires the images at a constant rate of approximately 60 Frames Per Second (FPS).

During configuration, the acquired images are transmitted to the Host PC for visualization. Depending on the Host PCs characteristics and the USB connection, the FPS rate may differ. The value displayed in the bottom left corner of the *WinClient* GUI is the current FPS rate detected by the Host PC. However the real FPS of the DynaPCN 10-20-00 is not affected by these external factors and remains at 60 FPS.

The tabs

The figure displays three screenshots of the WinClient software interface, showing the Connection, Controls, and I/O Settings tabs.

Connection Tab: Features a 'Connect' button, a 'Scan' button, a 'Stop' button, and a 'Reboot PCN' button. Below the buttons are input fields for '10', '100', '10', and '2', with an 'Add' button.

Controls Tab: Includes sections for 'Date and Time settings' (Date: 7/ 2/2014, Time: 4:53:00 PM, Set Date and Time button), 'Installation Height (cm)' (225, Set button), 'Light intensity' (slider), 'In/Out direction' (radio buttons for In ↓ Out ↑ and In ↑ Out ↓), 'Door width' (slider, 120 cm), 'Door threshold' (slider, View Threshold checkbox), 'Data record' (Save records button), and a bottom section with buttons for Scene background, Reset Counters, Restore Factory Settings, and System Update.

I/O Settings Tab: Contains 'Optocoupled I/O functions' (GPI1, GPI2, Do nothing dropdowns, Set button), 'Optocoupled I/O test' (GPI1 Test, GPI2 Test, GP01 Test, GP02 Test, GP01 open time (ms) 200, GP02 open time (ms) 200), and 'RS485 Setup' (ID: 2, Baud Rate: 115200, Data Bits: 8, Parity: None, Stop Bits: 1, Set button).

Figure 3. Connection, Controls and I/O Settings tabs

The figure displays two screenshots of the WinClient software interface, showing the Wide-Gate and Advanced tabs.

Wide-Gate Tab: Includes 'Enable/Disable Wide-Gate' (Number of systems: 2, Enable Wide-Gate button, System 0 of 0), and 'Distance between systems (cm)' (60, Set button).

Advanced Tab: Includes 'No Tracking Zone' (Start Y, End X, End Y, Up Line, Down Line, Set button), 'PCN-1001 System Diagnostic' (System Diagnostic checkbox, Get Status button), 'Use Move Detection' (Move Detection checkbox), and 'Out-of-Range Manager' (Out-of-Range Enable checkbox, Check BG button).

Figure 4. Wide-Gate and Advanced tabs

The “Connection” tab

The “Connection” tab allows you to connect the DynaPCN 10-20-00.

Pressing the “Reboot PCN” button you can perform a hardware reboot of the DynaPCN 10-20-00.

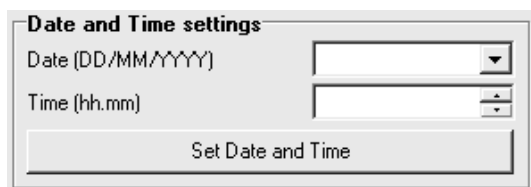


The “Controls” tab

The “Controls” tab allows you to change the main settings of the DynaPCN 10-20-00 in order to obtain a good resolution on windows 1, 2 & 3.

Any modifications to the settings will be automatically saved to the internal flash memory of the DynaPCN 10-20-00 and takes immediately effect (a reset is not needed).

Set the “Date and Time settings”

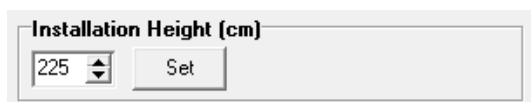


Displays and allows you to set the system time and date.

Set date and time correctly!

This is extremely important especially in stand-alone installations where the user periodically downloads data via the USB using the “Save Records” feature.

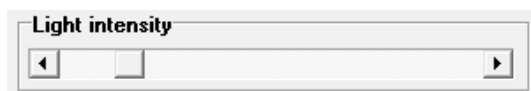
Set the “Installation Height”



Allows you to set the DynaPCN 10-20-00 installation height.

When the installation height is lower than 225 cm, it is recommended to use the “Out-of-Range Manager” function. See the “Advanced” tab for further information.

Set the “Light intensity”



Allows you to control the light intensity of the infrared illuminators and deal with low lighting environmental conditions.

Suggested setting: 70%. This guarantees a good balance between illumination and power consumption.

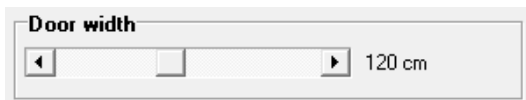
Set the “In/Out direction”



Set the direction for incoming and outgoing people correctly. Verify that when a person enters/exits the door, the correct counter is updated.

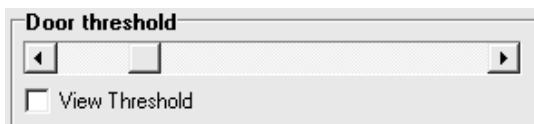
Changing the direction will reset the in/out counters.

Set the “Door width”



Set the value according to the width of the door to monitor.

Set the “Door threshold”

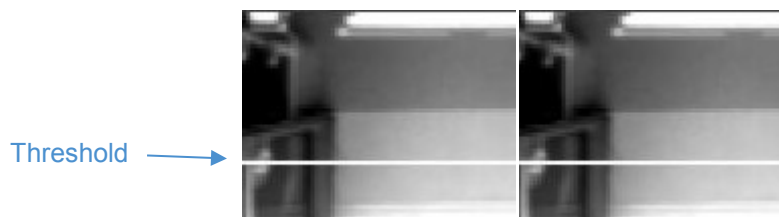


This is an important parameter that has to be properly set to obtain a reliable counting process.

During the tracking process, the two counters are incremented only if a person enters the detection area, crosses the door threshold and then exits from the detection area on the opposite side.

By default, the threshold is placed at row 60 (the image height is 120 rows). The position of the threshold line can be set between row 30 and row 89.

In each visualization mode, except for “Tracking”, flagging the “View Threshold” checkbox will display the current threshold (a white horizontal line) in Windows 1 and 2.

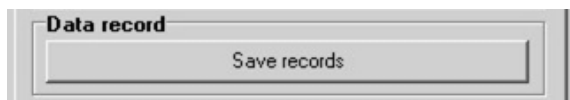


Find the best threshold position:

- Place it in a way that any person entering or exiting have to cross it.
- Place it away from high reflective surfaces (i.e. the steps on a bus/train). If the detection area includes also a portion outside the transportation vehicle, the door threshold should not be set outside.
- Place it away from door-opening mechanisms
- It should be placed in the middle of the detection area, which if the DynaPCN 10-20-00 has been installed correctly above the door, should correspond to a central position of the “Door threshold” slide bar

If a door is intended to be used in a single direction, for example “in only” or “out only”, it may be useful to move the threshold towards the exit edge of the detection area.

Save the “Data records”



The Incoming & Outgoing counters along with Time & Date information is saved immediately by the DynaPCN 10-20-00; every sixty seconds these values are appended to a text log file within the flash memory of DynaPCN 10-20-00. Depending on the Optocoupled I/O functions selected (see the '[Optocoupled I/O functions panel](#)' paragraph on page 57) the information written to the log file will be different.

The following paragraphs describe the available log file formats.

The log file

The log file is a series of text lines. There are four different types of line:

Boot: The following line is added each time the DynaPCN 10-20-00 completes a boot cycle:

Boot	<i>date</i> ³	<i>time</i> ⁴	<i>Counter In</i> ⁵	<i>Counter Out</i> ⁶
------	--------------------------	--------------------------	--------------------------------	---------------------------------

Count: The following line is added each time the counter registers a person as entering or leaving

Count	<i>date</i>	<i>time</i>	<i>Counter In</i>	<i>Counter Out</i>
-------	-------------	-------------	-------------------	--------------------

Start: The following line is added when the Digital I/O has been enabled or the RS485 command “enable_pc 1” is used

Start	<i>date</i>	<i>time</i>	<i>Counter In</i>	<i>Counter Out</i>
-------	-------------	-------------	-------------------	--------------------

Stop: The following line is added when the Digital I/O has been disabled or the RS485 command “enable_pc 0” is used

Stop	<i>date</i>	<i>time</i>	<i>Result In</i> ⁷	<i>Result Out</i> ⁸
------	-------------	-------------	-------------------------------	--------------------------------

³ The date in dd/mm/yyyy format

⁴ The time in hh/mm/ss

⁵ Quantity of incoming people

⁶ Quantity of outgoing people

⁷ Quantity of people added to the Counter In since the last Start command

⁸ Quantity of people added to the Counter Status Out since the last Start command

All the values in a text line are separated by a tab. This makes easy to export data into any spread-sheet application (e.g.: Microsoft Excel, OpenOffice, etc.).

Example

The following is an example of log file from a bus with a single door:

Action	Date	Time	Counter In	Counter Out
Boot	26/09/2011	08:51:10	000000	000000
Start	26/09/2011	08:51:20	000000	000000
Count	26/09/2011	08:56:37	000001	000000
Count	26/09/2011	08:57:08	000002	000000
Count	26/09/2011	08:59:00	000002	000001
Count	26/09/2011	08:59:10	000002	000002
Stop	26/09/2011	08:59:20	000002	000002
Boot	26/09/2011	09:10:00	000002	000002

In this example:

At 08:51:10 the DynaPCN 10-20-00 was powered on, the current counter values were:
0 In, and 0 Out

At 08:51:20 the door was opened

At 08:56:37 1 person entered

At 08:57:08 1 person entered

At 08:59:00 1 person exited

At 08:59:10 1 person exited

At 08:59:20 the door was closed, the values showed that 2 people had entered and 2 people had exited

At 09:10:00 the DynaPCN 10-20-00 was powered on (for example a reboot occurred)

Save the records of the log file

By clicking the “Save records” button you will be able to download the log file as text. You will be given the option to “Save As” – “filename.txt”.



NOTE:

The DynaPCN 10-20-00 can record a maximum of 300,000 log lines.
When the DynaPCN 10-20-00 exceed the amount of 299,999 log lines the internal software will overwrite the oldest block of 30,000 lines with the new data, leaving the remaining 30,000 x 9 lines already recorded.
In this case the system will continue to cancel and rewrite each successive block of 30,000 lines

It is possible to use the Mini USB 1.1 client connector located on the front side of the DynaPCN 10-20-00 in order to transfer data (i.e. to a Host PC).

Acquire the “Scene background”

Scene background

This is an important parameter that has to be properly set to obtain a reliable counting process.

The acquisition and storage of the background is a fundamental and sensitive issue.

A bad background acquisition can affect seriously the counting process.



IMPORTANT NOTE:

Acquire the background in the following circumstances:

- Once the DynaPCN 10-20-00 has been installed
- When the DynaPCN 10-20-00 has been relocated
- If the background has altered

Important issues:

- The background has to be taken with no foreign removable objects in the detection area
- The background has to be taken with doors open, especially if the doors would block the DynaPCN 10-20-00s' field of view as frequently occurs within buses or trains
- Lighting of the detection area should be diffused as much as possible. No spot lighting (e.g. solar reflections or strong lighting) should be present in the detection area during background acquisition
- Highly reflective, geometric structures situated on or near the floor, such as the metallic parts for door mechanisms, which cause extreme patterns of light and darkness when illuminated by strong light (e.g. direct sunlight or directional halogen lighting) could lead to flawed distance measurements. To avoid performance degradation due to these effects the structures and any high reflective surface should be avoided as much as possible in the detection area
- Metallic or shiny objects (such as handles, bars, glass, etc.) should not cover a significant part of the detection area. If this is not avoidable, the reflectivity of these items should be reduced by means of non-reflective materials or modifying the “No Tracking Zone”.

Save the background:

1. Connect the DynaPCN 10-20-00 by pressing the “Connect” button
2. Select “8bit Disp. + median + FPN + ODC” in the drop-down list. In this way Windows 1 and 2 will display the separated images as seen by the two cameras, subtracting the Fixed Pattern Noise (FPN) and the Optical Distortion Correction (ODC). Window 3 will display the disparity map and a median filter will be applied for reducing noise
3. **Ensure the doors of the gate are open!**

4. **Check that the DynaPCN 10-20-00 is correctly set up!**
This means that in windows 1 and 2 you must see the scene as captured by the two cameras while in window 3 the image has to be completely black or dark grey-scaled.
If for any reason it does not appear dark or any white spot appears, this will be recognised as one or more objects present in the detection area. A background stored in these conditions will cause a wrong count during the tracking process. Refer to the **“Important issues:”** paragraph above for possible solutions
5. Press the “▶” button. Press the “■” button
6. Select the “Controls” tab and click the “Scene Background” button. Ensure that window 3 remains completely dark or dark grey-scaled until the process has completed. If not restart from step “5”
7. Wait for the progress bar to complete. When completed, the “Scene background Saved!” dialog box is displayed. The DynaPCN 10-20-00 is now ready to operate

**NOTE:**

If the DynaPCN 10-20-00 is correctly connected via USB to the Host PC and the drivers is correctly installed but you still cannot see the images in windows 1 and 2, try to set the Host PC colour depth to 16 bit (or less) by going to the Start Menu > Settings > Control Panels > Display > Settings.

“Reset counters”

Set to zero the Incoming and Outgoing counters.

“Restore Factory Settings”

Resets the system to its original factory configuration.

Perform a “System update”

Use this button to upgrade the DynaPCN 10-20-00 software when a new version becomes available. Check periodically the Download area on the Eurotech website for the latest updates.

The “I/O Settings” tab

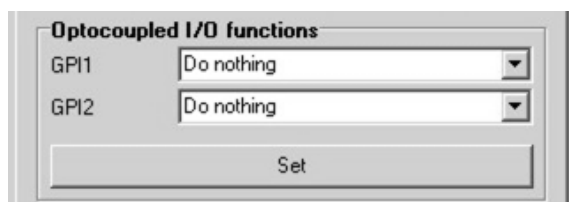
The DynaPCN 10-20-00 can be interfaced and triggered by means of 2 independent optocoupled inputs and 2 independent optocoupled outputs.

The RS485 port is the main communications interface used when the DynaPCN 10-20-00 is installed on-board a transportation vehicle.

Each modification to these settings will be automatically saved in the internal flash memory of the DynaPCN 10-20-00 and takes immediate effect (a reset is not needed).

The “Optocoupled I/O functions” panel

The two inputs, GPI1 and GPI2 (GPI means General Purpose Input), can be used in 6 different modes. These can be selected using the two drop-down menus.



Press the “Set” button to confirm the drop-down menu selection

Do nothing:	The system ignores any signals received on the input lines
Test:	Allows the operator to test the two input lines (See ‘ Optocoupled I/O test panel ’ on next page for more details).
Reset counters:	Sets the incoming and outgoing counters to zero when a rising edge is detected. In the Wide-Gate configuration, only the GPI2 can be set as reset. It has to be set connecting the first DynaPCN 10-20-00 and the signal will be available on the last PCN.
Enable/Disable counting	When the GPI1 / GPI2 inputs receive a rising edge (they are enabled) the DynaPCN 10-20-00 will start the counting process. When the GPI1 / GPI2 inputs receive a falling edge (they are disabled) the DynaPCN 10-20-00 will stop the counting process. In the Wide-Gate configuration only the GPI1 can be set as Enable/Disable.
Reset counters reverse:	Sets the incoming and outgoing counters to zero when a falling edge is detected. In the Wide-Gate configuration, only the GPI2 can be set as reset. It has to be set connecting the first DynaPCN 10-20-00 and the signal will be available on the last PCN
Enable/Disable counting reverse	When the GPI1 / GPI2 inputs receive a falling edge (they are disabled) the DynaPCN 10-20-00 will start the counting process. When the GPI1 / GPI2 inputs receive a rising edge (they are enabled) the DynaPCN 10-20-00 will stop the counting process. In the Wide-Gate configuration, only the GPI1 can be set as Enable/Disable.
The default mode for the DynaPCN 10-20-00 when powered-up is “Counting Enabled”. The counting will be Disabled / Enabled only when the GPI changes state.	

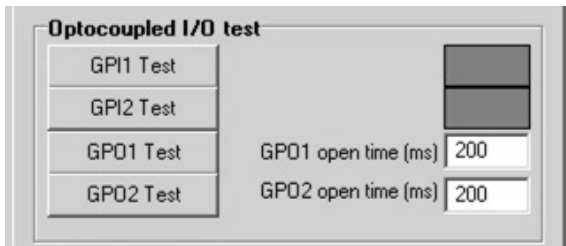
Example 1:

- The DynaPCN 10-20-00 is powered up: the counting will be enabled by default
- The GPI is enabled: the counting was already enabled at power up and nothing change
- The GPI is disabled: the counting will be disabled

Example 2:

- The DynaPCN 10-20-00 is powered up: the counting will be enabled by default
- The GPI is disabled: the counting will be disabled
- The GPI is enabled: the counting will be enabled

The “Optocoupled I/O test” panel



The two outputs, GPO1 and GPO2, (GPO means General Purpose Output) have the purpose to react when a person is counted:

- GPO1: By default is associated to incoming people
- GPO2: By default is associated to outgoing people

The optocoupled output electronics behave as low-side switches normally closed.

When the DynaPCN 10-20-00 detects a person, one of the two outputs (depending on the direction of the person) turns its status to open for a period of “GPO-Open-Time” milliseconds.

The GPO-Open-Time (GPOOT) can be configured inserting a value (from 8 to 1020 milliseconds) in the two GPO1 and GPO2 open time fields on the “Optocoupled I/O test” panels.

If two people walk in the same direction under the DynaPCN 10-20-00, the first signal will be immediately sent to the appropriate output, the second will be queued for (2 x GPOOT) milliseconds.

In the Wide-Gate configuration the GPO1 used will be the one of the first DynaPCN 10-20-00.

The GPO2 will be the one of the last DynaPCN 10-20-00. In any case, both the GPO-Open-Times have to be set connecting the first DynaPCN 10-20-00.

GPI1 Test / GPI2 Test

Follow these steps to test the inputs:

1. In the drop-down lists of the “Optocoupled I/O functions” panel select the option “Test” for either GPI1 or GPI2
2. Press the “Set” button
3. Press either “GPI1 Test” or “GPI2 Test” button. If a rising edge is received on GPI1 or GPI2, the corresponding grey rectangle will turn to white. If a falling edge is received it will turn to grey



NOTE:

The “Test” functions are only available via Socket API, not via RS485.

GPO1 Test / GPO2 Test

In order to test the outputs press the “GPO1 Test” or “GPO2 Test” button. The GPOOT value will be set to the nearest multiple of four lower than or equal to the inserted value.



NOTE:

The “Test” functions are only available via Socket API, not via RS485.

Notes about the Digital I/O interface

The DynaPCN 10-20-00 can be interfaced and triggered by means of two general-purpose inputs and two general-purpose outputs.

For example, the general-purpose digital I/O interface can be used to detect a doors status (open or closed).

The normal logic is:

- 0 Door closed
- 1 Door open

The counters will be activated when the door status becomes 1 (Open).

The reverse logic is:

- 1 Door closed
- 0 Door open

The counters will be activated when the door status becomes 0 (Open).

The counters will be activated when the door status becomes 1 (Open).

The general-purpose I/Os are 1 kV isolated and are available on the M1 connector.

They allow for a direct connection to industrial equipment with an isolation of 3750 V_{RMS}.

The Input Block

The figure below shows the electrical schematics of the input differential optocoupled block. The “Digital IN” labels on the left side refer to the digital IN signals on the M2 connector, while the right side of the figure refer to the internal processing part of the system. This input block can be connected to a standard TTL port. The Input Block draws a constant current when driven above the threshold.

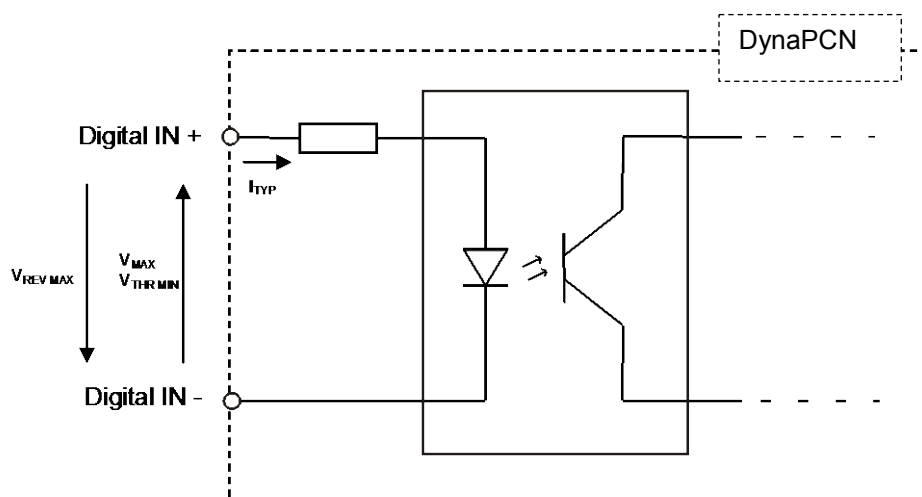


Figure 5. Electrical schematics of the input differential optocoupled block

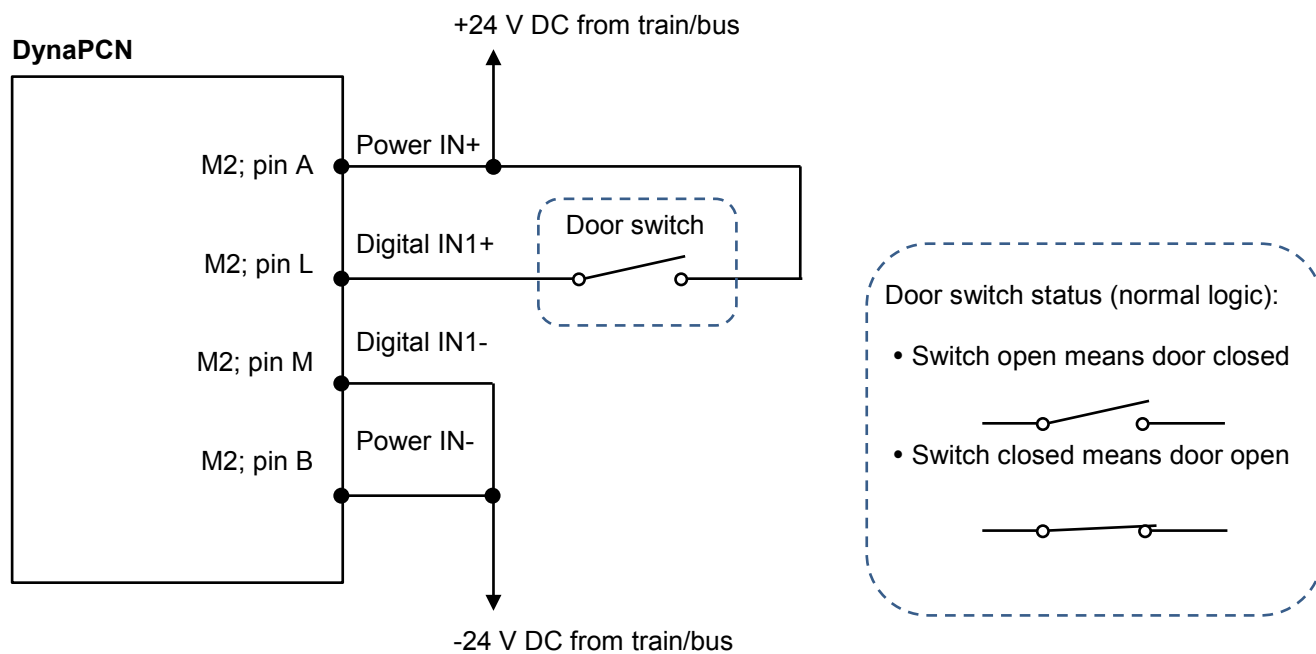
Recommended input operating conditions:

PARAMETERS	SYMBOL	VALUE	UNIT
Minimum Threshold Voltage	$V_{THR MIN}$	2.4	V
Maximum Voltage	V_{MAX}	32	V
Maximum Reverse Voltage	$V_{REV MAX}$	32	V
Typical Current	I_{TYP}	3.6	mA

Example: how to simulate a digital input using the normal logic

Make the connections displayed in the following figure.

The Door switch simulates the digital input.



The Output Block

The figure below shows the electrical schematics of the output block. The labels on the right side refer to the M2 connector, while the left side of the picture refers to the internal processing part of the system.

The Output Block behaves as a low-side switch. The load connected to the low-side switch can draw current either from an external power source or from the Digital OUT V+ referred to the Digital OUT GND.

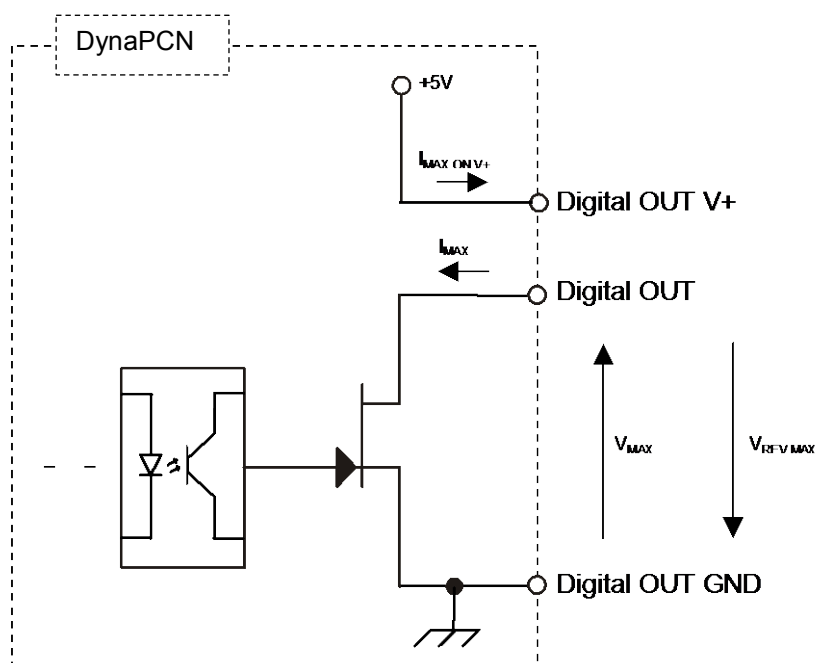


Figure 1. Schematics of the output differential optocoupled block

Recommended output operating conditions

PARAMETERS	SYMBOL	VALUE	UNIT
Maximum Voltage	V_{MAX}	32	V
Maximum Reverse Voltage	$V_{REV MAX}$	32	V
Maximum Current	I_{MAX}	300	mA
Maximum Current on Digital OUT V+	$I_{MAX ON V+}$	20	mA

The “RS485 Setup” panel

The features of this panel are not available with the DynaPCN 10-20-00 device.

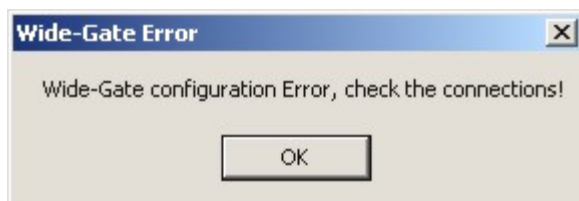
The “Wide-Gate” tab

If the gate is wider than 200 cm you have to connect together two or more devices. This configuration is called “Wide-gate” and requires a master device and one or more slave devices.

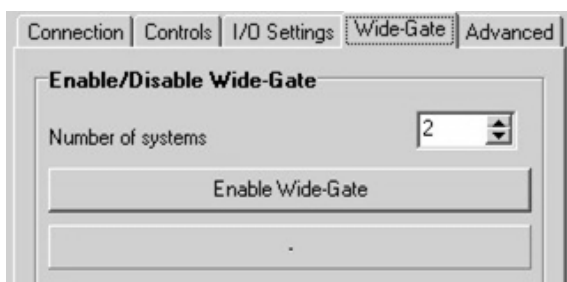
The “Wide-Gate” tab allows you to set up the parameters for the Wide-gate configuration.

Setting up the PCN-1001 devices for the Wide-Gate configuration

1. Connect properly all the counters
2. Connect your Host PC via the USB port (located under the service plate) to the Master (the one directly connected to the Control Unit)
 - a. Launch the WinClient utility and Click “Scan”
 - b. Connect the Master
 - c. Select the “Controls” Tab. Click “Restore Factory Settings”
 - d. Click “Yes” when the “Warning” message will appear.
If you do not perform a restore before configuring the “Wide-gate” mode you may receive the following error:



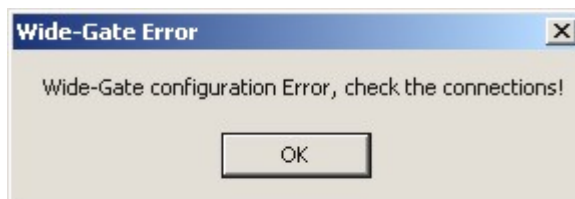
- e. Select the “Connection” Tab and click “Disconnect”
3. Connect your Host PC via the USB port to the 1st Slave
 - a. Click “Scan”
 - b. Connect the 1st Slave
 - c. Select the “Controls” Tab
 - d. Click “Restore Factory Settings”
 - e. Click “Yes” when the “Warning” message will appear
 - f. Select the “Connection” Tab and click “Disconnect”
4. Move to next Slave and repeat the above step 3 for all Slaves
5. Connect your Host PC via the USB port to the Master
 - a. Connect the Master
 - b. Select the “Wide-Gate” Tab
 - c. Insert the quantity of counters connected (i.e.: 2)



- d. Set the installation height (from the floor) of the counters



- e. Click "Enable Wide-Gate":
- If problems occur you will obtain a Wide-Gate Error. Check for the cable connections (you may have selected a higher system number than actually connected/available)



- If all is ok a confirmation message will appear. Click "OK"
- f. Select the "Controls" Tab
- g. Click "Scene Background"
- h. Click "OK" when a confirmation message will appear
- i. Select the "Connection" Tab and click "Disconnect"
6. Cycle the power on all the devices
7. Wait for the devices to boot
8. The devices are now ready for "Wide-Gate" counting operations

**Note:**

Remember to set the configuration parameters (direction, door threshold, light intensity, etc.). The configuration parameters have to be set only after the Wide-Gate mode has been enabled and you are connected to the Master. This will redirect the configuration parameters to the slave counters.

The “Advanced” tab

“No Tracking Zone” panel

NOTE: The no tracking zone feature is NOT available in Wide-Gate mode

The “No Tracking Zone” feature allows you to define rectangular zones in the detection area where tracking will not be performed. This feature can be used to mask surfaces that are very reflective or with spot lighting.

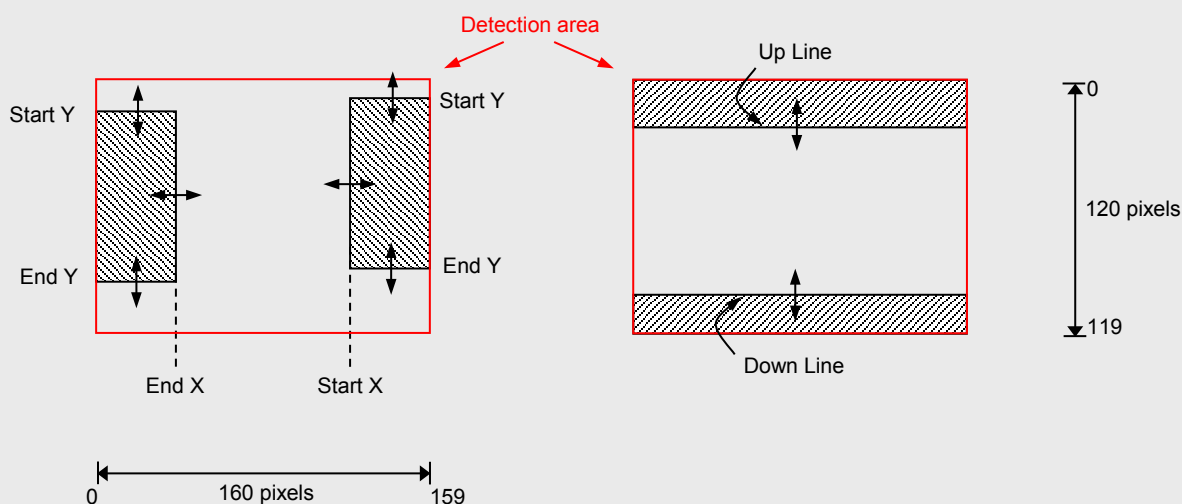
RANGES:

End X = pixel 0 to 70
 Start X = pixel 159 to 91
 Start Y = pixel 0 to 119
 End Y = pixel 119 to 0

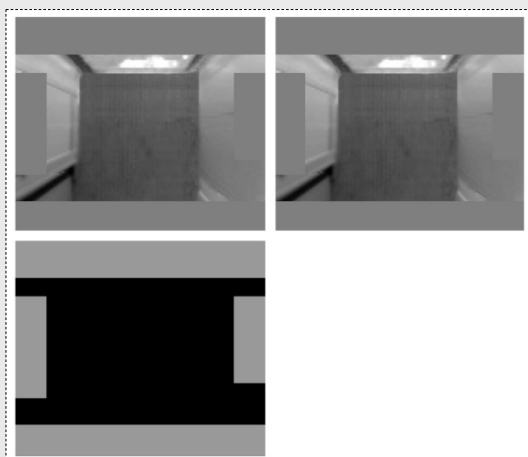
Up Line = pixel 0 to 59
 Down Line = pixel 119 to 60

Example:

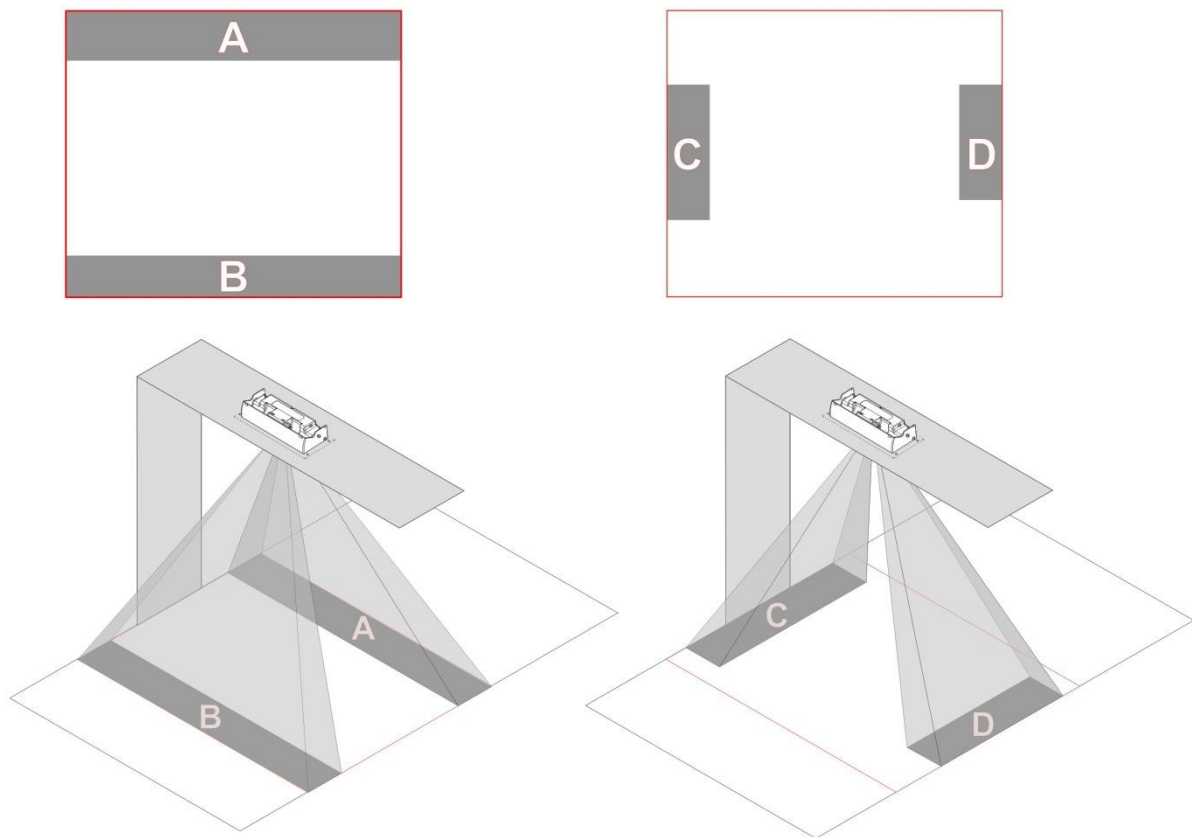
The picture below shows the Detection area with the no tracking zones represented as dashed areas:



The picture below shows how the Detection area will appear in the WinClient windows. The no tracking zones are represented as dark grey rectangles:

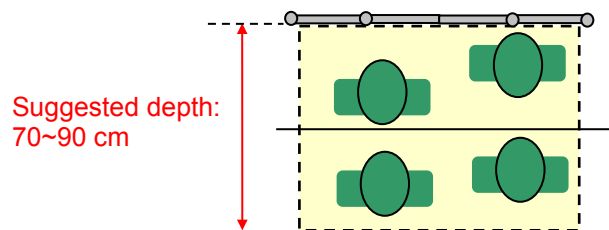


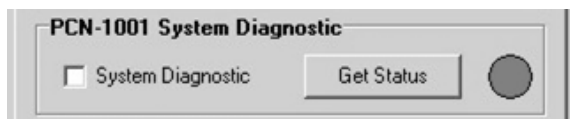
The picture below shows how the no tracking zones will affect the cameras' field of view and the Detection area.



Pay attention to the following issues:

- Exclude as much as possible the area outside the transportation vehicle
- Verify that all the entrance area is detected properly. Make a person move under the DynaPCN 10-20-00s and verify the correct detection
- The DynaPCN 10-20-00 can't track more than 10 people at a time. In particularly crowded conditions, i.e. on-board buses, 10 people can be compressed in less than 1 m^2 , so the detection area should be smaller. In these conditions a depth of 70~90 cm is fine to guarantee a good tracking of people.



“DynaPCN 10-20-00 System diagnostic” panel**Note:**

With the WinClient software revision 2.2 the “DynaPCN 10-20-00 System diagnostic” works only if the DynaPCN 10-20-00 is set in single configuration.

This is a diagnostic algorithm that detects and signals any problem that may occur to the optical section of the DynaPCN 10-20-00 (i.e.: blind cameras, cameras malfunction, luminosity too low, etc.).

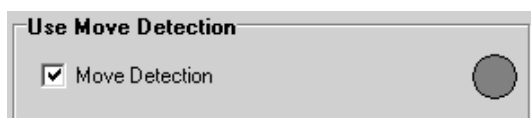
Pressing the “Get Status” button will change the colour of the grey circle:

- If the circle is red the diagnose is negative (there is a problem)
- If the circle is green the diagnose is positive (no problems occurred)

Every time the diagnostic status changes, it will be written on the log file

The following commands can be used to manage the system diagnostic:

COMMAND	DESCRIPTION
diagnostic_en 1 (unsigned char)	Diagnostic enabled (default configuration)
diagnostic_en 0	Diagnostic disabled
pcn1001_status	Returns the diagnostic status displaying two values (unsigned char) The first value will indicate the diagnose status: <ul style="list-style-type: none"> • If it is 1 the diagnose is positive (no problems occurred) • If it is 0 the diagnose is negative (there is a problem) The second value indicates the error code (it is 0 if the diagnostic is positive)

“Use Move detection” panel

“Use Move detection” is an algorithm that when enabled enhances the detection sensitivity.

**Note:**

It is suggested that this feature is kept as enabled.

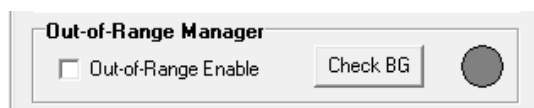
The colour of the grey circle will change in the following way:

- The circle should appear green when somebody is crossing the detection area
- The circle should appear red in other cases.

The following commands can be used to manage the Move Detection:

COMMAND	DESCRIPTION
move_det_en 1 (unsigned char)	Move detection enabled
move_det_en 0 (unsigned char)	Move detection disabled
move_det_val	Returns the current value of the "Move detection" parameter. Two values (int) will be returned, one for the right sensor and one for the left sensor. The final value should be the average between the right and left sensors
move_det_thr	Used to set the threshold value. Use the "Move_det_thr" followed by the value of the new threshold (int)
move_det_status	Returns the current move detection status displaying a value (unsigned char) that can be: 0 if the counting is disabled 1 if the counting is enabled because the "move detection" algorithm is disabled or because there is a cross through the gate

"Out-of-Range Manager" panel



"Out-of-Range Manager" is an algorithm that, when enabled, reduces the noise caused when a tall person is passing (18-20 cm from the sensor).



Note:
Keep this feature enabled.

The colour of the grey circle will change in the following way:

- The circle should appear red when there is noise
- The circle should appear green in other cases.

APPENDIX

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Ethernet Communication Protocol

Foreword

The interaction between the application software and DynaPCN 10-20-00 is based on a client-server model over TCP/IP.

The DynaPCN 10-20-00 acts as the “listening device” on port 5400.

The connection

The way to establish the connection between the client software and the DynaPCN 10-20-00 depends on which Operating System you are executing the client software on, and the programming language used.

However the rules to follow are the same as those used when creating a standard “stream socket” and a connection (“connect”) to the server.

Once the connection is established the application software can send the commands to the server.

The main commands

Command	Usage	Definition
gcounters	Returns the In/Out counter values	The application software sends to the server the string "gcounters". The server returns 4 bytes representing the <i>in</i> counter followed by 4 bytes representing the <i>out</i> counter
reset	Resets the In/Out counters	The application software sends to the server the string "reset". The server does not send any reply. To verify the correct command execution: <ol style="list-style-type: none"> 1. send the command "gcounters" 2. verify that the reply reports: zero as In value, and zero as Out value
diagnostic_en	Enable/Disable diagnostic	The application software sends to the server the string "diagnostic_en" followed by a byte. Set the byte to 0x01 to enable diagnostic, set to 0x00 to disable it.
pcn1001_status	Retrieve the device diagnostic status	The application software sends to the server the string "pcn1001_status". The server returns two bytes representing the diagnostic status. The first byte represents the overall diagnostic status: <ul style="list-style-type: none"> • 0: Status unhealthy, see second byte for details • 1: Status healthy The second byte, which has no meaning if the first one is '1', details the error condition: <ul style="list-style-type: none"> • 1 or 5: left sensor obstructed • 2 or 6: right sensor obstructed • 8: ambient light too dark • 3 or 7: both sensor obstructed • 4: sensors report different ambient light values

NOTE: The strings sent include the NULL terminator “\0”

DynaPCN 10-20-00 Logon

The DynaPCN 10-20-00 runs using an embedded Linux Operating System.

Use the ssh protocol (IP: 10.100.10.100) if for any reason it is necessary to log-on the Operating System .

Example:

```
ssh root@10.100.10.100
```

These are the default passwords:

LOGIN	PASSWORD
root	root
ftpuser	ftpuser

Passwords can be changed when you are logged on using “root” using the following command:

COMMAND	SYNTAX	EXAMPLE
passwd	passwd <user name>	# passwd ftpuser # conf-save

Installing the front panel with angles higher than 35°

**NOTE!**

Contact Eurotech before using this configuration to receive the right instructions to configure the software parameters of the DynaPCN 10-20-00.

If you need to mount the DynaPCN 10-20-00 front panel with angles higher than 35°, use the Case Extension to better protect the rear connections.

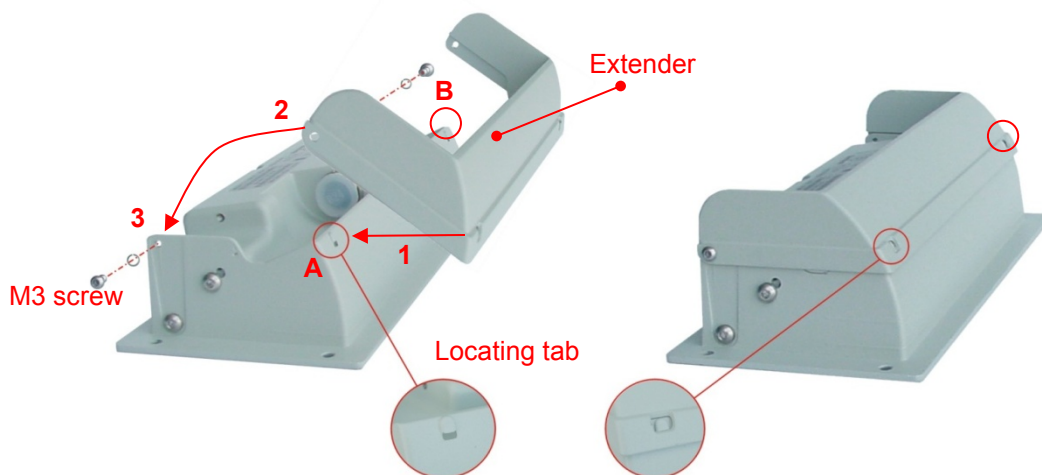
The order code of the Case Extension is “M11-10-10-00”.

Install any cabling before mounting the Case Extension; in this way you will have easier access to M1 and M2.

Use the two M3 x 6 hexagonal head screws and the two split washers provided to secure the Case Extension to the DynaPCN 10-20-00. A hexagonal 2 mm key/driver is required.

Follow this procedure to mount the Case Extension:

1. Place the Extension onto the rear of the DynaPCN 10-20-00; ensure that the two locating tabs (**A** and **B**) are correctly aligned
2. Ensure that the holes on the Case Extension and on the DynaPCN 10-20-00 are correctly aligned
3. Insert the two washers and the two M3 screws into the holes and firmly tighten them.

**NOTE!**

Once the DynaPCN 10-20-00 is installed, the angle of the front panel cannot be modified and the rear connectors cannot be accessed without removing the entire device from the ceiling.

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Troubleshooting


WARNING!

Before going further with this troubleshooting make sure you have **ALWAYS** installed the **SAME** REVISION of “*Imgserver*” and “*WinClient*”.

Incompatibilities will happen and cause problems if older and newer versions of either the “*Imgserver*” and “*WinClient*” are used together.

PROBLEM		POSSIBLE CAUSE	REMEDY
1	The amber and green LED indicators flicker constantly or remain dark.	DynaPCN 10-20-00 has wrong/no power supply.	Check the connections and the power requirements.
		DynaPCN 10-20-00 defective.	Contact your local Eurotech Technical Support Team. Refer to the back cover of this manual for full contact details
2	WinClient does not identify the IP address of the DynaPCN 10-20-00 automatically	Network issue	Check the network connection. Restart WinClient Type the address of the DynaPCN 10-20-00 manually
3	In window 3 the image appears bright or with white spots while in windows 1 and 2 it is possible to see the regular scene as captured by the two cameras (the function “8bit Disp. + median + FPN + ODC” is selected).	The floor is very reflective or has spot lighting.	Lighting of the detection area should be diffused as much as possible.
		Highly reflective, geometric structures situated on or near the floor, such as the metallic parts for door mechanisms cause extreme patterns of light and darkness. These effects can be caused by solar reflections or strong lighting on metal surfaces.	Highly reflective structures and any high reflective surface situated on or near the floor should be avoided as much as possible in the detection area. Reduce the reflection by means of non-reflective materials or paints.
			Modify the “No Tracking Zone”.
4	DynaPCN 10-20-00 seems to function but counters are not incremented properly.	Door is closed and the counting is activated / deactivated by the GPI1/GPI2 inputs so that counting only takes place when the door opens.	Open the door or check the configuration of the digital inputs.
		DynaPCN 10-20-00 incorrectly configured.	Adjust the DynaPCN 10-20-00 configuration. Pay particular attention to: <ul style="list-style-type: none"> the background acquisition the door threshold
		DynaPCN 10-20-00 defective.	Contact your local Eurotech Technical Support Team. Refer to the back cover of this manual for full contact details
5	It is impossible to see the images in windows 1 and 2 even if the DynaPCN 10-20-00 is correctly connected via USB to the Host PC and the drivers are correctly installed	Host PC colour depth too high	Set the Host PC colour depth to 16 bit (or less) by going to the Start Menu > Settings > Control Panels > Display > Settings
		Host PC firewall incorrectly configured	Refer to “Configure the Host PC firewall” on page 31
6	Counter results poor in one / both directions (i.e.: false positives due to shoulders or other body parts counted as people).	Disturbing objects in the detection range block the DynaPCN 10-20-00.	Remove the objects and reacquire carefully the background (refer to problem # 2).
		DynaPCN 10-20-00 incorrectly set.	Rearrange the DynaPCN 10-20-00
		DynaPCN 10-20-00 installed too high/low.	Install the DynaPCN 10-20-00 at a maximum of 250 cm above the floor. Evaluate carefully the average population's high.
		The detection area is too little respect to the gate	Modify the “No Tracking Zone”.

PROBLEM		POSSIBLE CAUSE	REMEDY
7	Too many false negatives	There is a counting enable delay	The digital inputs should enable the DynaPCN 10-20-00 as soon as the door starts opening.
8	Too many false positives	There is a counting disable delay	The digital inputs should disable the DynaPCN 10-20-00 after the door is closed completely.
		The "Use Move detection" grey circle appears green even if nobody is crossing the detection area	Reacquire carefully the background (refer to problem # 2). It is strongly recommended to don't acquire the background if the circle appears green but nobody is crossing the detection area.
		The door mechanisms are counted as people entering.	Shift the "threshold line" outside the mechanism motion range.

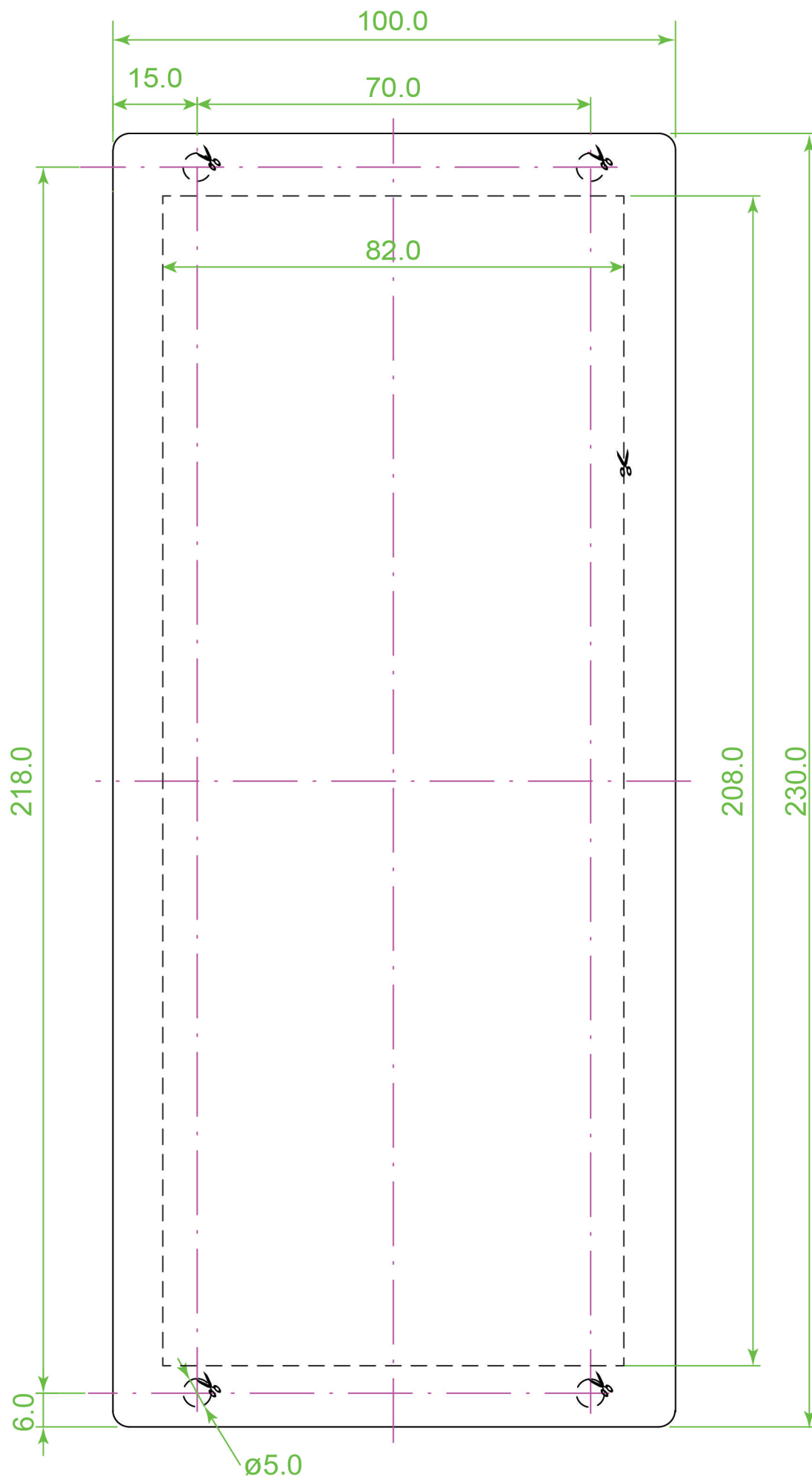
Cut-out template

To simplify the DynaPCN installation you can print this page in A4 format (e.g.: on card or plasticard) without any scaling and use it as a cut-out template.

Before using this page, verify that the dimensions in the printed sheet correspond to the real ones.

Dimensions in millimetres

10.0 mm (scale 1:1)



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Notes

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